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BIBLIOGRAPHY OF THE PUBLICATIONS OF Dr. M. S. RANDHAWA

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गुरुकुल कांगड़ी विश्वविद्यालय
कृपया पुस्तक के ऊपर कोई निशान आदि
न लगायें।

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पुस्तकालय
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PHOOL MALHOTRA
M.A., M.LIB.SC.
Assistant Librarian, PAU Library

LUDHIANA
PUNJAB AGRICULTURAL UNIVERSITY
1970

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Published by the Agricultural Information Officer,
Punjab Agricultural University, Ludhiana

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Randhawa, Mohinder Singh, 1909

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PREFACE

Dr. Mohinder Singh Randhawa, is one of the great prolific writers of our times, who has contributed so richly and abundantly to our knowledge of subjects as diversified as Kangra paintings and the algae. The annotated documentation of his published works had, therefore, both been a necessity and a challenge. All his published works, books, speeches, addresses, articles in periodicals, newspapers etc. were located and scanned during the course of visits to many libraries and institutions. The co-operation of Dr. Randhawa was also sought and he gave some rare items and press-clippings not available elsewhere, from his personal archives.

The bibliography has been compiled on systematic lines, and his writings have been grouped by subjects, with a title and subject index. The annotations have been given in almost all cases to indicate the coverage; and in few cases, they are in the nature of abstracts. The annotations to his writings on algae have been doubly checked for exactitude of terminology and contents. A list of articles on Dr. Randhawa is given at the end as an appendix. Information about some contributions published subsequently have also been given as an addendum.

To distinguish a monograph from a article in a periodical, the later is enclosed within double quotes. Authorized abbreviations of periodicals are used and italicised. Details about the volume, date of publication and pages are also given.

I have also to express my gratitude to the fellow librarians who allowed me full access to their resources which enabled me to collect and collate the contributions so widely scattered in a multitude of books, periodicals and pamphlets.

I have also to thank Mr. S. K. Khosla, Stenographer to the University Librarian, Punjab Agricultural University, for typing the manuscript with so much care, and Mr. A. C. Goel, Press Manager, University Press, for printing it in record time.

PAU Library
Ludhiana, February, 1970.

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INTRODUCTION

A short account of the published works of Dr. M. S. Randhawa

No living writer has contributed so much, and so richly, or who could be considered an authority on so many of them, as Dr. Mohinder Singh Randhawa. His published works cover over 30 books, and innumerable articles, papers and pamphlets—both learned and popular. Art and algology, geology and agriculture, trees and towns, flowers and history, planning and literature, museums and libraries, have all been the subject, and object, of his writings. He inspired a generation of artists and writers and fought for the recognition of their work, and is one of the makers of modern Punjab. A systematic bibliography of his writings had, therefore, been long due.

The life of this great son of Punjab is well documented. His role as an I.C.S. officer and administrator, and his work for the rehabilitation of the uprooted people of the state have been graphically described by A.N. Bali in his *Glimpses of Punjab's history* (Delhi, 1969). His work on algae has been carefully documented by G. S. Venkataraman in *Phykos* (v. 7, 1968). The All India Fine Arts and Crafts Society, too brought out a special presentaion volume of *Roopa-Lekha* on his work as an art critic and aesthete, carrying tributes from all over the world. His services to Punjabi literature, and to the building of the modern Punjab, are also given in another commemoration volume presented to him at Chandigarh in 1969 and published by Atma Ram & Sons in 1970. The Horticultural Society of India has brought out a book *Some famous gardens of India* the preface to which contains an account of his contribution to horticulture and floriculture.

Born of a middle class family, he was always a brilliant student, and took his M.Sc. degree in first class from Punjab University, Lahore, in 1930. He qualified for the Indian Civil Service in 1934, and was posted as assistant magistrate at Saharanpur, U.P. He continued with his first love—botany, inspite of his magisterial preoccupation and his earlier contribution on algae to the *Journal of Indian Botanical Society* dates from this period. He has now contributed more than 40 original papers on phycology to periodicals in India, U.K., U.S. and Germany. It was in recognition of his work on Indian algae that the degree of *Doctor of Science* was conferred upon him by the Punjab Universty, in 1955. He discovered and described a new genus and many species of the family Zygnemaceae.

His first venture in the realm of art—algae as a decorative design for textile printing—was a unique blending of science and art, and took place while he was

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posted at Faizabad in U.P. The textiles with designs of desmids and diatoms were printed by the U.P. Government Handicrafts Emporium, Lucknow, to his designs.

In 1945, Dr. Randhawa was appointed the Secretary of the Indian Council of Agricultural Research, but after a year he took over as the Deputy Commissioner of Delhi—the first Indian to hold the post. Though he played a heroic role in bringing peace to strife-torn city, he has, unfortunately, left this phase out of the purview of his pen. We have only a few words of Khushwant Singh about what he felt, and the daily newspapers of that period contain numerous references to him. He has himself described his work for the rehabilitation of the uprooted people of Punjab in his famous book *Out of the ashes* published in 1954. He took over as the Director-General of Rehabilitation in 1949.

He was again with Indian Council of Agricultural Research in 1955, as its Vice-President, and served it in that capacity for five years. Quite a number of publications published by the Council were either written by him or compiled under his editorship. He edited a series of monographs on algae for the Council, and himself contributed the first, *Zygnemaceae*, in 1959, a family of green algae on which he had done exhaustive work.

His great book *Flowering trees in India* was also published by the Indian Council of Agricultural Research, in 1957, about which the Commonwealth Agricultural Bureaux rapturously commented "In this charming book, painter, poet, administrator and horticulturist are met together in a festival of flowering trees" (*Horticultural Abstracts* Dec. 1959).

His addresses to the various conferences and committees of the Council throw much light on the development of agriculture in India. These would have been lying buried in the Council files and would have been lost to the readers if Dr. Randhawa had not published them. The *Trends in agricultural research* published as an annual volume by the Council contain most of his addresses and include such diverse subjects as cotton, wheat, rice, spices, groundnuts and rinderpest. *Farmers of India* series whose fourth volume was published only this year, is another monumental publication and covers every aspect of agricultural development and life of the peasantry, of every state in India.

As adviser on natural resources to the Planning Commission, Dr. Randhawa laid stress on scientific agriculture, advancement of agricultural research and agricultural education, which led ultimately to the establishment of agricultural universities and to the 'Green Revolution'. Most of his papers and reports to the Planning Commission have been officially published.

Dr. Randhawa's love for horticulture is well known. He has contributed more than any one else to landscape planning and development of gardens. There are

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books and articles on trees of every kind, gardens of every type and flowers of every colour, and how they can be grown for shade, for fruits, and for sheer lovelines, in towns, country and homes. Even railway tracks which present such a dull panorama can be beautified this way, he says in one of his pamphlets. In the issues of *Indian farming*, *Indian horticulture* and in numerous addresses and pamphlets he has spoken enthusiastically for 'bio-aesthetic planning'. Even college magazines and newspapers have reproduced his articles on gardens and gardening.

The book *Tree cult and tree worship in Buddhist-Hindu sculpture* published by the All India Fine Arts and Crafts Society, in 1964, is probably the only publication on the ancient tree-lore of India. Not so well-known is that it was Dr. Randhawa who introduced the *Van mahautsav* in our times. The Punjab Agricultural University Library has his manuscript in Urdu, of his address at the Red Fort when the tree festival was inaugurated back in 1947 by Pandit Jawaharlal Nehru who was Prime Minister of India presiding over the composite interim government containing leaders of the Muslim League.

Chandigarh is another place with whose development his name would be for ever associated. It is not that he was its administrator during 1966-68 but that he transformed a soul-less city into a beautiful town of magnificient boulevards and gardens—the rose garden is one of the biggest in India. He has himself written much on Chandigarh. He has contributed two great museums to Chandigarh, viz., the Museum of Art with a unique collection of Pahari miniature paintings, and Museum of Evolution of Life which will also be a centre for popularization of science.

The evolution of life on our planet had always engrossed him as a subject. In many of his articles he traced the origin of life through the geological eras to our own times. The Council of Scientific and Industrial Research have published the *Evolution of Life* which he wrote jointly with the Kalinga prize winner, Jagjit Singh. This book provides an account of evolution of life with special reference to fossils from India. It also mentions how the man reached present production stage, and how history has been affected by climatic factors and droughts. Even domesticated animals—the horse, the camel, the elephant, the cow—had a role in the history of India.

In November 1968, Dr. Randhawa took over as the Vice-Chancellor of the Punjab Agricultural University. His addresses to the students and to the members of the faculty are not routine academic palliatives but positive enrichment of the literature on higher education. As leader of the team of the vice-chancellors of agricultural universities which visited the 'new world' he gave a remarkable address tracing the evolution of higher learning through Buddhist times to the agricultural universities.

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A visit to the Lahore Museum in 1932 was his first introduction to Kangra valley art. Since then it had been a passion with him and on which he is a recognized authority. His first book on painting *Kangra valley painting* was published in 1954 by the Publications Division of the Government of India. He has written profusely and profoundly on every aspect of Kangra art and, as Barrett and Basil Grey have observed, he "has gone perhaps further in this direction than most students would care to follow". His studies of Kangra paintings of *Gitagovinda, Bihari Satsai, Bhagvatapurana, Rasamanjari*, as also of Basohli and Chamba paintings, are classic. He sees in Kangra art the fulfilment of the culture of the North in the same way as Ajanta represents the fulfilment of the culture of the South, as he said in his contribution to a volume of essays presented to the great historian, Sir Jadunath Sarkar. In collaboration with the former American ambassador in India, Professor John Kenneth Galbraith, he has published the book, *Indian painting* from United States. He has contributed many articles on art, particularly on the art of Kangra valley, to the *Roopa-Lekha, Marg* and the *Studio* and has described and identified many new centres of Pahari paintings such as Baghal, Nalagarh, Nurpur and Mankot. Dr. Randhawa has also introduced the work of many young modern painters, like Sushil Sarkar, Damyanti Chawla, Bireshwar Sen and others.

As an indefatigable traveller Dr. Randhawa has also written delightful travelogues on his Himalayan treks. Hill stations and mountain resorts, rivers and glaciers, obscure places and unknown dak-bungalows hidden in inaccessible heights of the Himalayas have been so picturesquely described by him in a series of articles contributed to the well-known daily of Lucknow, the *Pioneer*. He also met the humble hill-folks and wrote of their life and loves, and their songs. In fact he has collected and published the folk-songs of the people of Punjab, Haryana and Himachal which were in the process of being slowly forgotten and lost.

Dr. Randhawa is not only a writer of books but also their lover. He is one of the leaders of library development in Punjab and apart from the library at Chandigarh, he has established number of libraries for the common people in every town in joint Punjab and also in many villages. It is unfortunate that his address at the silver jubilee celebrations of the Punjab Library Association, as also on the foundation laying ceremony of the new Punjab Agricultural University Library, have not been published, but those who heard him would remember it for a long time. He is an expert in museology too and is responsible for the museum at Chandigarh which has often been called the "Louvre of India".

A word must be said about Dr. Randhawa's services to Punjabi literature, which he literally resurrected from obloquy. He edited a monograph on Punjab, in Punjabi, dealing with every aspect of its history, culture, art, language and literature. The

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works of the Punjabi poet, Puran Singh, are now known and appreciated all over India through his endeavours. The greatful people of the state presented him with an *abhinandan granth* on his 60th birthday.

Some libraries have tried to build up a complete collection of his writings, but this too is an impossible undertaking, because he has contirbuted so widely that it is no easy task to know about them, much less to acquire a copy. The Punjab Agricultural University Library has been endeavouring to build up such a collection, and has even secured microfilms of his articles from various periodicals, but some still continue to elude us. His contributions to phycology are deposited with the Algae Laboratory of the Indian Agricultural Research Institute, New Delhi, from where reprints were secured for the Punjab Agricultural University. The newspaper articles were secured from his personal collection for bibliographical citation, but the library has no copy of these. There are still many files of manuscripts and typescripts in the museum library at Chandigarh, but it could not be known if they all have been published, and where ?

The ink from his pen still continues to flow, and it is, indeed, an impossible task for a bibliographer to compile his bibliography with any degree of finality. But the work, nevertheless, cannot be further postponed.

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SCIENCE

Museums

1 Museum of evolution of life in Chandigarh. Chandigarh, Union Territory Administration, 1968. 11p.

——, *Everyday Sci.* 13(1), Nov. 1968 : 1-7.

Difficulties which led to the abandonment of a 'Museum of Knowledge' of Le Corbusier, in place of the governor's palace and author's plan for a museum of evolution of life, to be run in liaison with the university, with a part of the collection also accessible to the public.

2 "Plan for a museum of science", *Yojna* 5(1), 1961 : 57-62.

——, *Everyday Sci.* 7(3-4), Sep.-Dec. 1961 : 45-51.

Need for such a museum, first suggested by the author in 1945, and details what the museum, proposed under the third Five Year Plan, for New Delhi, should contain.

History

3 "March of science", *Everyday Sci.* 1(1), 1952 : 1-3; (1)2, 83-88; 1(3), 1953 : 167-168 and 1(4), 1953 : 247-248.

Editorial. Survey of the development of science from ancient times.

GEOLOGY & PALEONTOLOGY

THE HIMALAYAS

4 The birth of the Himalayas. Bombay, National Information and Publication, 1947.

Geological history of the Himalayas.

5 "Shiwalik", *Panj Dariya* (Punjabi) 24, Jan. 1962 : 25-29.

Beauty and glory of the mountain range that forms the foot-hills of Himalayas in north-west.

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EVOLUTION OF LIFE

6 Evolution of life. Lucknow, U.P. Handicrafts, 1939. 6p.

An illustrated folder describing a curtain printed to the design conceived by Dr. Randhawa, while at Tanda, Faizabad (U.P.), depicting the pageant of life from unicellular creatures to the *Homo sapiens*. The library copy contains corrections in the author's own hand.

7 Evolution of life. New Delhi, C.S.I.R., 1969. 360p. illus.

In collaboration with Jagjit Singh, A. K. Dey and Vishnu Mitter. A comprehensive survey of the origin and evolution of plants, animals and man through the geological eras, to the dawn of agricultural age.

8 Geological landscapes showing the evolution of life through the ages. *In* M. S. Randhawa. Ambala Cantt., Tribune Pr., 1948 : 5.

Sixteen paintings, showing the various stages in the evolution of plant and animal life, produced under the direction of Dr. Randhawa. Now in the National Institute of Sciences, Delhi.

9 "Life in the Carboniferous period—the coal age—the age of amphibia (lycopods)", *J. scient. ind. Res.* 11A, 1952 : 452-462.

——, *Everyday Sci.* 2(4), July 1954 : 258-269.

The period of the Palaeozoic era which was marked by the formation of coal beds from luxuriant plant life, swampy forests and big fernlike trees. Evolution of animal life, particularly amphibians, reptiles and insects.

10 "The story of life through the ages", *Everyday Sci.* 2(1), 1953 : 6-14.

The Jurassic (Rajmahal) period : the age of dinosaurs, flying reptiles and primitive birds and of seed plants like cycads and caytoniales.

11 "The story of life through the ages (I) : The Archaeozoic era", *Everyday Sci.* 1(1), 1952 : 11-23.

The earliest geological era which endured for 500,000,000 years, when rudimentary life is believed to have existed.

12 "The story of life through the ages (II)", *Everyday Sci.* 1(2), Jan. 1953 : 89-97.

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Science Publications

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The Devonian period—the fourth period of the Palaeozoic era when shallow seas spread over the land. Evolution of land plants and animals. Age of fishes and early attempts at conquest of land.

13 "The story of life through the ages (III)", *Everyday Sci.* 1(3), April 1953 : 181-187.

The Permian period : the age of seed ferns (pteridosperms) and primitive reptiles.

14 "The story of life through the ages (IV)", *Everyday Sci.* 1(4), July 1953 : 253-258.

The Triassaic period : the age of seed ferns and reptiles.

15 Zindgi ki kahani. Rai Bareilly, U.P., Public Pr., 1943.

Evolution of life. In Hindi.

——, Rai Bareilly, U.P., Public Pr., 1943.

Evolution of life. In Urdu.

BOTANY

Addresses and speeches

16 "Nature conservation, national parks and bio-aesthetic planning in India", *Proc. 36th Indian Sci. Congr.* pt. 2, 1949 : 87-103.

Presidential address to the section of botany at the Science Congress held at Allahabad. Growth of national parks in foreign countries and the need for a new policy for conservation of natural resources in India, including the establishment of a central biological service, and a legislation for the preservation of wild life. Bio-aesthetic planting of trees, and town and country-side planning.

17 "Recent advances in the study of the structure of chromosomes and mechanism of photosynthesis", *Natn. Acad. Sci. India*, Annual no., 1961 : 17-24.

Presidential address at the 13th annual session of the National Academy of Sciences of India, held at Allahabad in February 1961. Discusses heredity, molecular biology, origin of life and molecular cross-breeding, precision tools and photosynthesis.

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General

18 "Colour and colour schemes", *Our India*, 1947.

Colours, their physical causes and plant pigments. Out of print.

19 "New plants for old", *Indian Fmg* 8(5), 1947 : 223-228.

Popular account of plant breeding in India.

ANGIOSPERMAE (*Flowering plants*)

20 "A podostemad from Kumoan central Himalayas", *Curr. Sci.* 13(2), Feb. 1940 : 50.

Joint communication with A. C. Joshi. A new species of the genus *Zeylandium*, family Podostemonaceae, recorded by the authors from the bed of the Kosi river at Chananda, 26 km. from Almora (U.P.).

ALGAE

Addresses and speeches

21 "Welcome address", *In* Proc. of the Symposium on Algology. New Delhi, ICAR, 1959 : 4-24.

At the symposium on algology organized jointly by the ICAR and UNESCO South Asia Science Co-operation Office, New Delhi, in December 1959. A historical review of the studies on algae, their economic utilization and classification.

22 "Algae in relation to food and agriculture", *Everyday Sci.* 4(3-4), 1956 : 5:9.

Based on the address at the conference of workers on algae, on May 31, 1956, at New Delhi. Uses of seaweeds as source of human food, manures, fodder and as fish feeding and retaining agent.

General

23 Algae designs in cloth printing. *In* M. S. Randhawa. Ambala Cantt., Tribune Pr., 1948 : 5.

A decorative design for textiles, depicting the beauty of the microscopic plants, introduced by the author at Tanda, U.P.

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24 "Marked periodicity in reproduction of the Punjab freshwater algae", *Proc. Indian Acad. Sci. B.* 3(5), May 1936 : 401-406.

Seasons in which they appear, including periodicity of reproduction.

25 "Occurrence and distribution of the freshwater algae of north India", *Proc. Indian Acad. Sci. B.* 4(1), July 1936 : 36-40.

Brief ecological survey of the freshwater algae of northern India based on the 420 samples collected by the author from Punjab and U.P. during 1931 to 1936. The samples comprised 122 species which include two new genera and 16 new species.

CHLOROPHYTA (*Green algae*)

26 "A note on two interesting freshwater algae from Kerala State, India", *Curr. Sci.* 31(6), June 1962 : 259.

Ecballocystis fritschii and *Tetrasporidium* collected by the author from Pallar river in Kottayam district, in Jan. 1959.

27 "Budding in Protosiphon botryoides Klebs", *Curr. Sci.* 9(1), Jan. 1940 : 26-27.

Communication on an alga found growing in plenty in heavily manured surroundings of Guptar Ghat in Faizabad, U.P.

28 "A note on cyst-formation in Protosiphon botryoides (Kutz.) Klebs", *Curr. Sci.* 2(2), Aug. 1933 : 55-56.

Joint communication with S. L. Ghose on the algae collected from Bodal in Hoshiarpur district (Punjab), where it appeared in great abundance in fields lying fallow after rains, in October, 1929.

29 "Ghosella indica gen. et. sp. nov., a new member of the conjugate", *J. Indian bot. Soc.* 13(1), 1934 : 11-16.

Description, with illustrations, of this member of the conjugate, first found free floating in a pond, with *Nodularia* sp. near Hamira, Jullundur distt. (Punjab), in March, 1930.

30 "Notes on some Ulotrichales from northern India", *Proc. natn. Inst. Sci. India* 14(8), 1948 : 367-372.

Enumerates a dozen species belonging to a few genera from some of the localities in Punjab, Kashmir, Kumaun and northwestern U.P.

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31 "A note on species of Stichococcus and Hormidium from Delhi", *J. Indian bot. Soc.* 38(3), 1959 : 398-399.

Information about a species, recognised by Fritsch as belonging to the order Ulotrichales, appearing on flower-pots in the cold months as dark-green covering and have a pronounced preference for baked clay, disappearing in March.

32 "Observation on some new and interesting algae from northern India", *Hedwigia* 78, 1939 : 273-283.

Reports the presence of some new species including *Microspora indica* sp. nov. *Cylindrocapsa oedogonioides* Randhawa and *Cylindrocapsa scytonemoides* sp. nov. belonging to genera which have drawn scant attention from the algologists of India and are very rare, with the exception of first mentioned species.

33 "Short note on an Indian variety of Sphaeroplea annulina (Roth.) Agardh, var. multiseriata, var. nov.", *Proc. Indian Acad. Sci. B.* 4(5), Nov. 1936 : 405-407.

An Indian variety of the above species collected by the author in 1930 from ponds in Punjab and named as Var. nov. *multiseriata* due to multiserial arrangement of ova and oospores.

34 "A new species of Cylindrocapsa from India : Cylindrocapsa oedogonioides sp. nov.", *Proc. Ind. Acad. Sci. B* 4(5), Nov. 1936 : 408-410.

A new species of the rather uncommon genus *Cylindrocapsa* noted by the author for the first time in Dasuya (Punjab) in 1930-31 and named as *Cylindrocapsa oedogonioides* sp. nov. Its methods of reproduction and sex organs differ from that of *Cylindrocapsa involuta* Reinsch—the only species worked out of this genus.

35 "Genus Cylindrocapsa in India", *Curr. Sci.* 10(4), June 1941 : 292-294.

Various stages in its life cycle.

36 "A note on aplanospores in a species of Oedogonium", *Proc. Indian Acad. Sci. B* 6(4), Oct. 1937 : 230-231.

Some sporelike bodies in a species of *Oedogonium* noted by the author in 1936 and recorded as 'Aplanospores' rather than 'Akinetes' as diagnosed earlier.

37 "Contribution to our knowledge of the freshwater algae of northern India : I. Oedogoniales", *Proc. Indian Acad. Sci. B* 4(2), Aug. 1936 : 97-107.

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Describes 18 species of the genus *Oedogoniales* recorded by Link in 1820 from northern India.

38 "Perennation in Oedocladium operculatum Tiffany", *Curr. Sci.* 9(7), July 1940 : 326-327.

Communication. The alga found on sandy soils, after rains in Kumaun Hills, U.P.

39 "Notes on three species of Oedocladium from the Himalayas", *Trans. Am. microsc. Soc.* 60(4), Oct., 1941 : 417-420.

O. Himalayense from ranges of Kumaun, with additional notes on *O. operculatum* indicating that the genus is merely an advanced *Oedogonium* and not derived from *Bulbochaete*.

40 "A critical review of some recently created new species of Indian Zygnemales", *Proc. Indian Acad. Sci. B.* 18(4), Oct. 1943 : 73-82.

Brief history of the work done on the members of the order Zygnemales in India and abroad. Systematic study of some of the new species of this order.

41 "Sirocladium, a new terrestrial member of the Zygnemales", *Bot. Gaz.* 103(1), Sep. 1941 : 192-197.

Sirocladium, types *S. Kumaoensis*. Collected by the author from Kumaun Hills, U.P. in September 1934.

42 "Further observations on the genus Sirocladium", *Bot. Gaz.* 119(3), Mar. 1956 : 201-202.

Reports the presence of a rare alga, in Calcutta, first noted by the author in 1941 and describes a new species of this genus collected from Western Ghats.

43 "Zygogonium Kumaoensis : a new species of Zygogonium from Kumaun", *J. Indian. bot. Soc.* 19(5-5), 1940 : 247-249.

Life cycle, structure and mode of reproduction of the new species, recorded by the author, found growing at the sides of red clay in the form of whitish feltlike covering near village Jariakhali, Almora (U.P.) in September 1939 and named as *Z. kumaoensis* sp. Nov.

44 "Some pecularities in conjugation in a new Himalayan species of Zygnema", *Proc. Indian Acad. Sci. B* 12(4), 1940 : 129-132.

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An interesting species collected by the author in September 1939, from Almora district, U.P. Differs from all the previously described species of *Zygnema* in its peculiar mode of lateral conjugation and position of zygospores. Established as a new species called *Zygnema himalayensis* sp. nov.

45 "Notes on some new algae from India", *Bot. Gaz.* 120(1), Sep. 1958 : 25-31.

Description of three new species : *Sirocladium vandalurense*, *Mougeotia indica* and *Oedocladium terrestris*. *Sphaeroplea annulina* has been reported for the first time from the high altitudes of inner Himalayas.

46 "On akinete formation in Zygnema terrestris Randh.", *Curr. Sci.* 12(1), 1943 : 26.

A peculiar method of akinete formation in the above species of algae recorded from the material collected by the author near Dhakuri in Kumaun Himalayas and noted the presence of the same in Kashmir also.

47 "Three new species of Zygnema from northern India", *Proc. Indian Acad. Sci. B* 4(3), Sep. 1936 : 239-245.

Three new species of genus Zygnema (i.e. *Z. Czurdae* sp. nov.; *Z. giganteum* sp. nov. and *Z. Iyengari* sp. nov.) their description and peculiar reproductive phases.

48 "Zygnema terrestris Rand. from the Kumoan Himalayas", *Curr. Sci.* 9(8), Aug. 1941 : 273-274.

Describes species found mostly at an altitude of 1,800 to 2,200 meters above sea-level which show an exclusively scalariform mode of conjugation and higher up conjugates exclusively in lateral position.

49 "Reproduction in Zygogonium ericetorum Kutz.", *Curr. Sci.* 28(1), Jan. 1959 : 24-25.

Two collections of this algae, one collected by Dr. Aiyappa from Coorg and the other by the author from Nandi Hills, Mysore, in 1958, are recorded for the first time in India and their reproduction described.

50 "Notes on Zygogonium ericetorum Kutz. from Java", *Phykos* 1(1), 1962 : 23-24.

An algae growing extensively near the valcano Tungkuban Prahu, Java (Indonesia) noted by the author in October 1956.

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51 Zygnemaceae. New Delhi, ICAR, 1959. 478p. illus. (ICAR monographs on algae).

First of a series of comprehensive monographs on algae in India. Describes 580 species of the genera of the family *Zygnemaceae*. The work was originally done during author's magisterial tours.

52 "A note on some attached forms of Spirogyra from the Punjab", *Proc. Indian Acad. Sci.* 4(3), 1936 : 246-249.

Three fertile species of Spirogyra (i.e. *S. affinis* Kutz., *S. dubia* Kutz. and *S. sp.*) from India growing in an attached condition and not the free floating one as is the case with the other species of this genus.

53 "A note on two new species of Spirogyra and Sirogonium", *J. Indian bot. Soc.* 37(3), 1958 : 380-381.

Collected by the author from freshwater ponds in Karnal district (Haryana). The *Spirogyra karnalae* differs from other related species in having a reticulate medium spore wall, the *Spirogonium reticulaum*, from its nearest relation *S. illinoisense*, in the size of filaments, number of chloroplasts and the absence of the scattered protuberances on the spore wall.

54 "Observation on some Zygnemales from northern India; Part I and Part II", *Proc. Indian Acad. Sci. B.* 8(3), 1938 : 109-150 and 8(4), 1938 : 336-366.

The algae collected by the author from Punjab and U.P. during 1929-38. Members of the order Zygnemales show marked periodicity in occurrence and reproduction in northern India with regard to their time of germination, vegetative development, conjugation and period of spore ripening. Characteristics for identification and systematic enumeration of the species observed.

55 "Genus Zygnemopsis in northern India", *Proc. Indian Acad. Sci. B* 5(6), June 1937 : 297-314.

The author added six Indian species to the already described 14 species of the above genus. Brief review of the genus which occupies a unique place in the order Zygnemales due to its transitional nature.

56 "Notes on some Cladophorales from India", *Proc. natn. Inst. Sci. Ind.* 27(2, Pt. B), April 1961 : 52-55.

Jointly with G. S. Venkataraman. Four members of the order, with description of the mechanism of spore liberation in *Pithophora polymorpha*.

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57 "Further observations on Fritschiella tuberosa Iyengar", *New Phytol.* 45(2), Dec. 1946 : 278-279.

Life cycle and structure of the algae noted by the author at two places in U.P. in 1937 and 1942.

58 "A note on cyst-formation in Fritschiella tuberosa Iyengar", *Arch. Protistenk.* 92, 1939 : 131-136.

Cyst formation as common and prevalent mode of perennation in *Fritschiella.*

59 "Notes on some Chaetophorales from India", *Phykos* 1(1), 1962 : 44-52.

Jointly with G. S. Venkataraman. Describes a few species of the genus *Chaetophorales*—one each of *Draparnaldiopsis, Stigeoclonium, Fritschiella, Aphanochaete* and *Physolinum* and two of *Trentepohlia* and *Coleochaete.*

60 "Systematic and morphological studies on the Chlorophyceae of northern India." 1956.

Dissertation submitted for the doctoral degree of Panjab University in 1956.

CHRYSOPHYTA (*Golden algae*)

61 "Akinete formation in Vaucheria geminata", *Bot. Gaz.* 103(42), June 1942 : 809-811.

A var., probably *V. geminata* var. *longistipilate*, collected in Punjab.

62 "Aplanospore-formation in Vaucheria uncinata Kutz.", *Curr. Sci.* 2(1), 1933-34 : 15-16.

Joint communication with S. L. Ghose. Specimens of this alga, partly submerged in a drying puddle and partly exposed to dry air, were collected and it was found that filaments from the submerged parts were laden with oospores and antheridia while in the exposed portion aplanospore-formation was dominant.

63 "Further observations on Vaucheriaceae from northern India", *J. Indian bot. Soc.* 21(5-6), Nov. 1942 : 263-266.

A species collected from Amarnath (Kashmir) and Kumaun Himalayas and another from Tons and Chambal rivers in U.P.

64 "Genus Vaucheria in northern India", *Archiv fur Protistenk.* 92(3),

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1939 : 537-542.

Describes a few species of the above genus including various stages in its life-cycle.

65 "Iwanoffia terrestris (Iwan.) Pascher from Fyzabad", *Curr. Sci.* 9(10), 1940 : 459-461.

Structure, life history and ecology of this alga which is characterized by terrestrial habitat and the presence of biciliate macro- of micro-zoospores.

66 "A note on a club-shaped variety of Botrydium granulatum (L.) Grev. var. Clavaeformis var. nov.", *Proc. Indian Acad. Sci. B* 11(5), 1940 : 222-224.

Interesting alga, first described by Iyengar in 1928 and recorded by the author in 1938 and established as a new variety of *Botrydium granulatum* due to its persistent club-shaped appearance.

67 "Species of Botrydium from northern India", *Bot. Gaz.* 105(4), June 1944 : 483-486.

Review of vars. collected by the author from U.P.

CYANOPHYTA (*Blue-green algae*)

68 "Genus "Anabaenothrix" and parallelism in evolution in freshwater algae", *Proc. Indian Acad. Sci. B* 3(5), May 1936 : 407-410.

Establishes a new genus *Anabaenothrix* having three different species with the common characteristics of having numerous trichomes enclosed in a single sheath. Out of three species two were discovered by the auhor, i.e., *A. cylindrica* Randhawa and Ghose and *A. epiphytica* Randhawa and Ghose.

AGRICULTURE & ANIMAL HUSBANDRY

Addresses and speeches

69 "Agricultural progress", *Madras agric. J.* 44(1), Jan. 1957 : 14-25.

Welcome address at the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research. Reviews work of the Council in agriculture and animal husbandry, and its future programme.

70 "Agricultural revolution of the twentieth century", *Cocon. bull.* 11(10),

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Jan. 1958 : 343-356, 370.

Address at the 28th meeting of the Advisory Board of the Indian Council of Agricultural Research. How agricultural production can be revolutionized through intensive cultivation, improved seeds, greater use of fertilizers and more effective control of pests and diseases.

71 "Agriculture and animal husbandry in India", *Everyday Sci.* 4(2), 1956 : 20-24.

Based on the address at the 26th meeting of the Advisory Board of the Indian Council of Agricultural Research on Jan. 12, 1956. Programme for development and research in the second Five Year Plan.

72 "Farm officers asked to help raise output", *Tribune* Jan. 25, 1965 : 3.

Inaugural speech at the annual meeting of the officers of agricultural department, Punjab, held at Chandigarh on Jan. 24, 1965. Role of the agricultural officers in acquainting the farmers with the improved technology in farming, providing marketing facilities, planning production programmes and recording their results.

73 "Plea for world co-operation : solving food problem", *Times of India* April 3, 1965 : 3.

Presidential address at the symposium on international co-operation in agricultural improvement in India, held at New Delhi on April 1, 1965. Urgent need for free exchange of agricultural know-how, co-ordination of agricultural research and extension and modification of foreign training programmes, including establishment of agro-industries in rural areas.

74 "Progress in agriculture and animal husbandry in India (1956-57)", *Sci. and Cult.* 23(9), March 1958 : 456-460 and 23(10), April 1958 : 536-541.

Speech at the 28th meeting of the Advisory Board of the Indian Council of Agricultural Research on November 28, 1957. Review of agricultural and horticultural development and animal husbandry in India during the twentieth century and various measures required for improvement.

75 Welcome speech. New Delhi, ICAR, 1956. 5p.

Address at the 26th meeting of the Advisory Board of the Indian Council of Agricultural Research on January 12, 1956. Reviews agriculture, animal husbandry and horticulture in the second Five Year Plan; and also need for security of service for research workers and for filling in the gap between research and extension.

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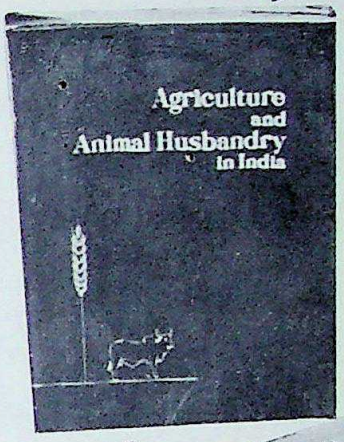

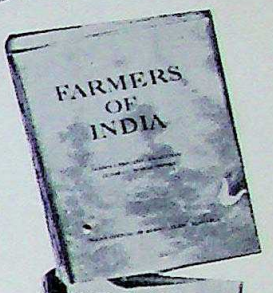

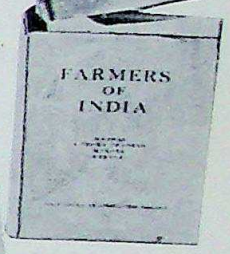

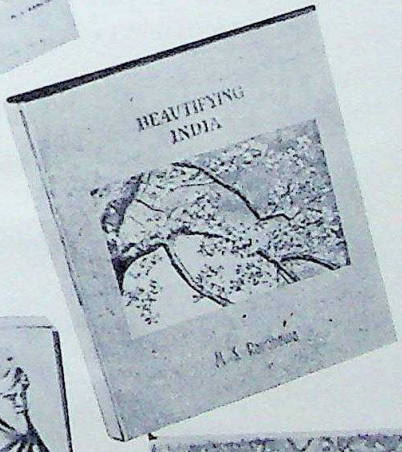

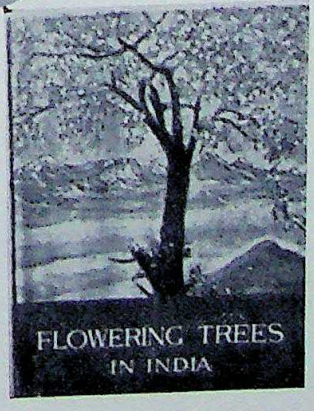

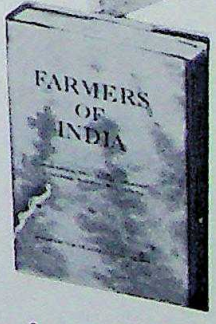

Books on Agriculture and Horticulture

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76 Welcome address : F A.O. International Training Centre in Fisheries Statistics, Bombay, 1959? 3p.

Address, as vice-resident, Indian Council of Agricultural Research and director of the International Training Centre in Fisheries Statistics, at the commencement of the centre on February 13, 1959. Library copy has corrections and additions in the author's handwriting.

77 Welcome address. Simla, Himachal Pradesh Administration Pr., 1959. 5p.

Address as vice-president, Indian Council of Agricultural Research at the seminar on recent advances in agronomy and soil science and their application to increase crop production, inaugurated by N. V. Gadgil, governor of Punjab, on June 16, 1959.

General

78 Agricultural and animal husbandry in India. 2nd rev. ed. New Delhi, ICAR, 1962. 342p. illus.

Originally published in 1958. Information about important crops, their production and varieties, including breeds of animals. Compiled while the author was Adviser, Planning Commission.

79 Bharat ke kisan. New Delhi, ICAR. 1963. 264p. illus.

Hindi translation of Farmers of India, v. 1.

80 Bharat me krishi aur pashupalan, translated by O. P. Sharma. New Delhi, ICAR, 1963. 368p.

Hindi translation of his 'Agriculture and animal husbandry in India'.

81 Farmers of India. New Delhi, ICAR, 1959-1968. 4v. illus.

——, v. 1. Punjab, Himachal Pradesh and Jammu & Kashmir, by M. S. Randhawa and Prem Nath. 1959. 302p. illus.

——, v. 2. Madras, Andhra Pradesh, Mysore and Kerala, by M. S. Randhawa and others. 1964. 428p. illus.

——, v. 3. Assam, Orissa, West Bengal, Andamans & Nicobar, Manipur, NEFA and Tripura, by M. S. Randhawa, Ashoka Mitra and Gisela Mehta. 1964. 429p. illus.

——, v. 4. Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, by M. S. Randhawa and others. 1968. 318p. illus.

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A comprehensive study of the peasants and rural life of different states, including topography, soils, climate, crops, agricultural practices, village organizations and folk culture.

ORGANIZATIONS

82 Agricultural research in India : institutes and organisations. 2nd rev. ed. New Delhi, ICAR, 1963. 220p. illus.

First published in 1958. Directory of organizations, institutes and colleges dealing with agriculture and animal husbandry in India and the work being done there.

83 "The Food and Agriculture Organization of the United Nations", *Indian Fmg* 7(1), Jan. 1946 : 5-7.

The conference held at Quebec, Canada, on November 1, 1945, when FAO formally came into existence. Also discusses the future programmes of the Organization.

AGRICULTURAL EDUCATION

Addresses and speeches

84 "Address", *Indian J. agric. & vet. Educ.* 1(2-3), Feb. 1959 : 73-76.

Address, as Vice-President, Indian Council of Agricultural Research, at the inauguration of Post-Graduate School of Agriculture, Indian Agricultural Research Institute, Delhi, on October 6, 1958.

85 Agricultural universities in India—progress and problems, 1968. 20p.

——, University News 7(1), Jan. 1969 : 16-17, 21-22.

——, *In* Fifth National Agriculture Fair, Bombay, March-May, 1969, Souvenir. Bombay, Bharat Sewak Samaj, 1969 : 57-78.

Address as the leader of the Indian team of Vice-Chancellors of agricultural universities at the Agricultural Division of the National Association of State Universities & Land Grant Colleges at Washington (U.S.) on November 12, 1968. Short history of agricultural universities in India and the progress they have made.

General

86 "The contribution of agricultural universities to economic development in India", Ludhiana, Punjab Agricultural University [1969] 18p.

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University education from ancient times to modern farm universities modelled on the land grant college pattern, with special reference to the Punjab Agricultural University and its role in bringing about the "Green Revolution".

87 "Higher scientific training in agriculture", *AICC econ. Rev.* 10(12), Oct. 15, 1958 : 5-6.

A plea for more facilities for higher education and research in agriculture.

88 "I.A.R.I. post-graduate school of agriculture", *Indian J. agric. & vet. Educ.* 1(1-2), Feb. 1959 : 79-82.

Programme of development of the new institution for higher education in agriculture, which came into being at the Indian Agricultural Research Institute, Delhi on October, 1958.

89 Introduction. *In* New concepts in agricultural education in India. Ludhiana, Punjab Agricultural University, 1969 : i-viii.

Historical development from ancient times to farm universities, and the role of the later in increasing agricultural production.

90 "New type education the Pusa Post-Graduate School would provide", *Indian Fmg* n.s. 8(8), Nov. 1958 : 3-5.

History of the Indian Agricultural Research Institute, Delhi, from 1905 to October 6, 1958, when a new post-graduate school came into existence and how the new system of education differs from the one commonly followed in other universities.

PUNJAB AGRICULTURAL UNIVERSITY

Addresses and speeches

91 Citation for the conferment of the degree of Doctor of Science (honoris causa) on Dr. Norman C. Borlaug. Ludhiana, PAU, 1969. 2p.

Services of Dr. Borlaug in improvement of wheat production in India and in Mexico.

92 "PAU has done splendid work, says the new Vice-Chancellor, Dr. Randhawa", *Prog. Fmg* 5(2), Nov. 1968 : 14-15.

An edited version of his address to the staff and students of the Punjab Agricultural University at Ludhiana on taking over as the Vice-Chancellor, on October 28, 1968. Includes a profile.

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93 Report of the Vice-Chancellor, Dr. M. S. Randhawa. Ludhiana, Punjab Agricultural University, 1969. 23p.

Welcome speech at the 5th annual convocation of the Punjab Agricultural University on March 19, 1969. Report of the Punjab Agricultural University and the programme for its development.

General

94 "Varsity organization on U. S. pattern", *Indian Express*, March 19, 1969 : 5.

Organization of the Punjab Agricultural University on the pattern of land grant colleges in U.S.A. and the progress it has achieved.

AGRICULTURAL RESEARCH

Addresses and speeches

95 Agricultural research. *In* Trends in agricultural research, 2[1957] : 7-16.

Address at the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research on November 22, 1956. Reviews work in agriculture and animal husbandry, including gap between research and extension.

96 Agricultural research. *In* Trends in agricultural research, 3[958] : 3-25.

Address at the 28th meeting of the Advisory Board of Indian Council of Agricultural Research on November 28, 1957. Review of the work of the Council during 1957.

97 Agricultural research. *In* Trends in agricultural research, 4[1959] : 8-31.

Address at the 29th meeting of the Advisory Board of the Indian Council of Agricultural Research. Principal developments in agriculture and agricultural research, suggestions for the improvement of the research organization of the Council and some new projects in the third Five Year Plan.

98 "Talking of research", *Indian Fmg* n.s. 6(11), Feb. 1957 : 25-26.

Excerpts from the speech at the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research in December 1956. Need for removal of gap between extension and research; including more facilities for veterinary education and research.

99 Trends in agricultural research, New Delhi, ICAR [1956]. 62p.

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Excerpts from speeches. Review of research work in cotton, coconut, jute, oilseeds, tobacco, spices, cashewnut, lac, crops and soils.

100 Trends in agricultural research. *In* his Trends in agricultural research. New Delhi, ICAR [1956] : 3-13.

Excerpts from speech delivered at the 26th meeting of the Advisory Board of the Indian Council of Agricultural Research held on January 12, 1956.

Reports

101 Report of the Agricultural Research Review Team. New Delhi, ICAR, 1964. 66p.

Submitted on March 19, 1964 as Adviser (Resources) Planning Commission. Recommendations and suggestions for improving the status and conditions of employment for scientific personnel, establishing a new council for agricultural and food research and greater emphasis on the use of research information.

102 Report of the second joint Indo-American team on agricultural education, research and extension. New Delhi, ICAR, 1960. 97p.

Submitted as the chairman of the team to the Ministry of Agriculture on July 11, 1960. Review of the work of past five years, and supplementary recommendations for the third Five Year Plan, including continuance of agreement with five American universities.

General

103 "Research in agriculture and animal husbandry", *Commerce* 95 (2442), Dec. 1957 : 96, 172.

Review of research work in agriculture and animal husbandry, suggestions for the improvement of research organizations and the need for removing the gap between research and extension.

104 "Research and agriculture under second Five Year Plan", *Sci. and Cult.* 21(10), 1956 : 566-570.

Reviews how the second Five Year Plan will bring prosperity by increasing agricultural production through more use of fertilizers, application of atomic energy, exploitation of research in horticulture, security of service for research workers, and publicity.

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HISTORY OF AGRICULTURE

105 "Agriculture, an historical retrospect", *Indian Fmg* n.s. 14(9), 1964 : 4-6.

Plants and trees as messengers of culture, and introduction in India of some popular vegetables, crops and plants. Co-relates the history of agricultural development with anthropological development of the world.

106 "New tools and thoughts for our agriculture : symposium on agriculture", *Yojna* 8(1), 1964 : 21-25.

Brief history of agriculture in India and the steps required for its improvement in the form of more fertilizers, reclamation of wastelands, frequent use of pesticides and weedicides, better machinery, better marketing and the filling of gap between research and extension; as also educational facilities for the farmers.

SCIENCE AND AGRICULTURE

Addresses and speeches

107 "Atomic energy for crop improvement", *Bull. Indian central Cocon. Committee* 9(12), 1956 : 258-260.

Address at the 11th meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry in India on June 14, 1956. Use of atomic energy for agriculture, soil fertility and fertilizers, utility of soil tests, reclamation of land and review of the work done on virus diseases and their causes and control.

108 "Role of the latest scientific research in solving major agricultural problems in India", *Andhra agric. J.* 7(2), 1960 : 21-36.

Welcome address at the 31st meeting of the Advisory Board of the Indian Council of Agricultural Research on 28th June, 1960. Review of major agricultural problems of India and how scientific research can help in solving these problems, specially food problems.

109 "Science to our aid : increasing agricultural production in India", *Sci. and Cult.* 26, 1959 : 31-33.

——, *Osmania Agriculturist*, 7. 1959-60 : 6-10.

Presidential address at the 28th session of the National Academy of Sciences of India, held at Allahabad in 1959.

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Papers and Reviews

110 "Putting Indian agriculture on scientific footing", *Indian Fmg* n.s. 12(2), Nov. 1963 : 6-8.

Excerpts from a paper read at the Indian Parliamentary Scientific Committee symposium on the 'Role of Science and Irrigation in Agricultural Production'.

111 Role of science and technology in Indian agriculture. New Delhi, Planning Commission, 1963, 17p.

——, New Delhi, Farm Information Unit, Directorate of Extension, Ministry of Food & Agriculture [1963] 25p.

——, *Sci. Parliam.* 1(2), 1963 : 46-66.

——, *Bharat Krishak Samaj Yearbook* 1964 : 181-194.

——, *Sci. World* 9(3), 1956 : 472-484.

Paper presented as Adviser (Resources) before the annual meeting of the Indian Parliamentary Scientific Committee held on September 19, 1963. Survey of new crops, irrigation, plant breeding, fertilizers, pesticides and weedicides and tapping marine resources, as also removal of unwanted cattle; agricultural development and agro-industries.

112 "Role of technology in Indian agriculture", *Major Indus. India Annual* 14, 1956-66 : 75-83.

Brief history of agricultural research in India. Need for more fertilizers, pesticides, weedicides and ancillary industries on which future agricultural progress depends.

113 "Science and technology in Indian agriculture", *Cocon. bull.* 18(2), 1964 : 45-57.

First part of a survey of the role of science and technology in Indian agriculture during the last 75 years.

114 "Science and technology in Indian agriculture", *Indian J. of Pwr. Riv. Valley Dev.* 13(11), Nov. 1963 : 1-4.

Paper read at the symposium on 'Role of Science and Irrigation in Agricultural Production' held on September 17-18, 1963 under the auspices of the Indian Parliamentary Scientific Committee.

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LAND AND SOILS

Addresses and speeches

115 Crops and soils. *In* his Trends in agricultural research. New Delhi, ICAR [1956] : 57-62.

Excerpts from at speech the 11th meeting of the Crops and Soils Wing of the Board of Agricultural and Animal Husbandry, 1956.

116 Welcome speech. *In* Proceeding of the 12th meeting of the Crops and Soils Wings of the Board of Agriculture & Animal Husbandry in India held at Simla from 5th to 11th June 1958. Delhi, ICAR, 1956 : 3-4.

Welcome speech at 12th meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry, held at Simla. Growth of the Crops and Soils Wing, and the work of the Indian Council of Agricultural Research since 1956.

117 "Resources for higher agricultural production", *J. agric. Coll. & Res. Inst.* (*Ranchi*) 2, Dec. 1962. 13-15.

Excerpts from welcome speech at the 13th meeting of Crops and Soils Wing of the Board of Agriculture and Animal Husbandry in India in June 1960 at Ranchi (Bihar).

118 Welcome speech. Crops and Soils Wing of the Board of Agriculture and Animal Husbandry in India, 13th meeting 7th to 10th June, 1960, Ranchi (Bihar). New Delhi, ICAR, 1960. 4p.

Soil testing, weed control, fertilizers, bacterial inoculants and improved seeds, for increased production.

Soil Conservation

119 Crops and Soils. *In* Trends in agricultural research. 4[1958] : 57-62.

Appeal for mobilizing all technical knowledge and resources for conservation of agricultural land, and to check soil erosion.

120 "Menace of soil erosion", *Indian Fmg* 6(12), 1945 : 544-551.

Damage done to agricultural land by soil erosion and need for erosion control measures.

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121 Study on wastelands including saline, alkali and water-logged lands and the reclamation measures. New Delhi, Planning Commission, 1963. 237p.

Report of the Committee on Natural Resources, Planning Commission with which the author was associated as adviser. Valuable information about wastelands with special reference to utilization of marginal lands.

FERTILIZERS

122 "Eighth wonder of the world", *Tribune* May 9, 1965 : 5

——, *Dhulia Coll. Agric. Mag.* 5(1), Jan. 1966 : 31-35.

Results obtained with the use of nitrogenous fertilizers.

123 "The miracle of nitrogen", *Indian Fmg* n.s. 85(3), June 1964 : 20-30.

——. *Khadi Gramodyog* 12(1), Oct. 1965 : 65-67.

Description of a visit to Maniara, a picturesque Kangra village which has increased its wheat production through fertilizers under the Indo-German Agricultural Project.

NATURAL RESOURCES

124 Committee on natural resources, organisations and problems proposed for study. New Delhi, Planning Commission, 1962. 57p.

A report, presented by the author as Adviser (Resources), Planning Commission, 1961-1964, on the organizations concerned with the exploration of natural resources in foreign countries and how the natural resources of India can be explored.

125 Co-ordinated study of organisations concerned with the survey of natural resources. New Delhi, Planning Commission, 1963. 82p.

Joint report on survey of India, geological survey of India, soil and land use surveys, forest surveys, cadastral and town-planning surveys.

126 Natural resources of India, a brief statement. New Delhi, Planning Commission, 1963. 24p. Maps.

Indicates the large potential for agricultural development and industrial production which could provide a continually rising standard of living and more opportunities for employment.

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AGRICULTURAL PRODUCTION AND PRODUCTS

RICE

127 "Record paddy crop this year", *Hindustan Times*, Jan. 5, 1965 : 5.

News conference, as Adviser (Resources) Planning Commission, about the achievements of intensive cultivation programme, particularly in Punjab and the Sutlej river bed project for the reclamation of waste land.

128 Rice. *In* Trends in agricultural research. 4[1959] : 60-62.

Welcome speech at the inaugural session of the conference of rice research workers, held at Cuttack (Orissa), on Feb. 16, 1959. The work of Indian Council of Agricultural Research and Central Rice Research Institute, Cuttack, in rice research.

TUBER CROPS

129 Welcome address at the inaugural session of the first meeting of the Tuber Crops Committee, on the 3rd June, 1959. Simla, H.P. Administration Pr., 1959. 4p.

Origin of the Committee and the problems of cultivation and storage of potato and other tuber crops.

COTTON

Addresses and speeches

130 Cotton. *In* his Trends in agricultural research. New Delhi, ICAR [1956] : 14-18.

Excerpts from a speech at the 23rd meeting of the Indian Central Cotton Committee, February 3-4, 1956. Regional research stations, ginning industry and publicity.

131 Cotton. *In* Trends in agricultural research. 2[1957] : 43-51.

Address at the 75th annual general meeting of the Indian Central Cotton Committee, on March 20, 1957. Reviews targets of production in the second Five Year Plan, import and export, legislation, etc.

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132 Cotton. *In* Trends in agricultural research. 3[1958] : 58-67.

Speech at the 76th meeting of the Indian Central Cotton Committee held at Bombay on July 19, 1957. Production in 1956-57, development in eastern India, statistics, imports and exports, prices and technological research.

133 Cotton. *In* Trends in agricultural research. 3[1958] : 67-74.

Speech at the 77th meeting of the Indian Central Cotton Committee held on February 21, 1958. Review of the work of the Committee, production of cotton, marketing surveys and results of research.

134 Cotton. *In* Trends in agricultural research. 4[1959] : 63-70.

Speech at the 79th meeting of the Indian Central Cotton Committee held at Bombay on March 20, 1959. Regional research, production in 1958-59, imports and exports, mixed cropping of cotton and groundnut, and research.

135 "President's address at the 77th meeting of the Indian Central Cotton Committee held at Bombay on the Feb. 21, 1958", *Indian Cotton Growing Review*. 12(3), 1958 : 186-188.

Review of the work of the Committee, production of cotton, marketing surveys and result of research in the field, including cropping with other cash crops, and development of more products and by-products.

136 President's speech. *In* Minutes of the Indian Central Cotton Committee meeting held at Bombay on the 7th Sep., 1956 : 2-6.

Review of the cotton legislation, research work and production.

General

137 "Cotton production in second Five Year Plan", *Indian Cotton Textile Industry Annual*, 1957-58 : 21, 23, 25.

Production targets, including need for producing extra long staple cotton, to conserve foreign exchange.

138 "Raw cotton in India—short staple for foreign exchange", *Major Industries of India Annual* 8, 1958-1959 : 101, 103, 105, 107, 109, 111.

Need for producing extra long staple cotton to conserve foreign exchange.

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139 Study of cotton in India. New Delhi, Planning Commission, 1963. 150p.

Report of a working group on cotton, presented by the author as Adviser (Resources) to the Planning Commission on January 3, 1963. Development of cotton cultivation in India, the present acreage, production and yield, and suggestions for future development.

JUTE

Addresses and speeches

140 Jute. *In* his Trends in agricultural research. New Delhi, ICAR [1956] : 26-31.

Excerpts from a speech at the main committee meeting of Indian Central Jute Committee, on March 23, 1956. Work of the committee in increasing jute production and training in jute research.

141 Jute. *In* Trends in agricultural research. 2[1957] : 25-30.

Address at the 20th annual general meeting of the Indian Central Jute Committee on November 10, 1956. Reviews research work and production including publicity.

142 Jute. *In* Trends in agricultural research. 3[1958] : 49-58.

Speech at the 21st annual general meeting of the Indian Central Jute Committee on September 19, 1957, held at Calcutta. Jute production in 1956-57 and prospects in 1957-58, including improved methods of cultivation and technological research.

143 Jute. *In* Trends in agricultural research. 4[1959] : 31-39.

Speech at the 22nd annual general meeting of the Indian Jute Committee, on November 29, 1958. Work of the Jute Research Institute, Jute Seed Multiplication Farm and *sisal* cultivation, etc.

General

144 Study of jute and mesta in India. New Delhi, Planning Commission, 1964. 59p.

Report of a study team of which the author was a member. Brief history of jute cultivation, important jute regions, measures taken under the first and second Five Year Plans, scope for cultivation of mesta with jute and recommendations for future development.

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TOBACCO

Addresses and speeches

145 Inaugural address. *In* Summary of proceedings, second conference of tobacco research workers, Anand. Dec. 17-18, 1959 : 18-22.

Place of tobacco in agricultural economy and the importance of research, on its technological aspects, to help the grower and the industry.

146 Tobacco. *In* his Trends in agricultural research. New Delhi, ICAR, [1956] : 38-44.

Excerpts from a speech at the 18th meeting of the Indian Central Tobacco Committee.

COCONUT

Addresses and speeches

147 "Central coconut Committee's work", *Cocon. Bull.* 11(12), March 1958 : 419-422, 427.

Welcome speech at the inauguration of the 25th plenary session of the Indian Central Coconut Committee on January 31, 1958 as President of ICCC. Reviews the work of the Committee, its research stations, nurseries and plant protection schemes as well as suggestions and recommendations of the special sub-committee.

148 Coconut. *In* his Trends in agricultural research. New Delhi, ICAR, [1956] : 19-25.

Excerpts from a speech at the 23rd meeting of the Indian Central Coconut Committee on March 3, 1956. Functions and work of the Committee.

149 Coconut. *In* Trends in agricultural research. 2[1957] : 30-38.

Address at the annual meeting of the Indian Central Coconut Committee on February 6, 1957. Reorganization of states and coconut production, development work, nurseries and expansion of cultivation, under the second Five Year Plan.

150 Coconut. *In* Trends in agricultural research. 3[1958] : 40-48.

Speech at the 25th meeting of the Indian Central Coconut Committee, on February 31 [*sic.*] 1958. Nursery schemes, plant protection, price of coconut oil, co-ordination of research and publications.

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151 Coconut. *In* Trends in agricultural research. 4[1959] : 53-59.

Address at the 26th meeting of the Indian Central Coconut Committee held at Trivandrum, on January 17, 1959. Co-ordination between the Committee and Department of Agriculture, Kerala; advantages of scientific cultivation, and good prices during 1958.

Report

152 Study of coconut in India. New Delhi, Planning Commission, 1963. 59p. 16 maps.

Report of a study team, appointed by the Committee on Natural Resources, Planning Commission, 1963, with which the author was associated as adviser.

SPICES

153 Species and cashewnut. *In* his Trends in agricultural research. New Delhi, ICAR [1956] : 45-51.

Excerpts from speech delivered at the first meeting of the Central Spices and Cashewnut Committee on December 8, 1956.

ARECANUT

Addresses and speeches

154 Arecanut. *In* Trends in agricultural research. 2[1957] : 38-43.

Address at the 8th annual general meeting of the Indian Central Arecanut Committee, on February 2, 1957. Cultivation of arecanut in India, diseases of arecanuts, and efforts to find other uses for it and its by-products.

155 Arecanut. *In* Trends in agricultural research. 3[1958] : 26-31.

Speech at the 9th annual general meeting of the Indian Central Arecanut Committee, on January 23, 1958. Programme of arecanut nurseries and increasing the yield of existing plantation through fertilizers, irrigation and plant protection techniques.

156 Arecanut. *In* Trends in agricultural research. 4[1959] : 45-52.

Opening speech at the 10th meeting of the Indian Central Arecanut Committee held at Trivandrum on January 12, 1959. The work of the Committee and arecanut development schemes.

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Report

157 Study on arecanut in India. New Delhi, Planning Commission, 1963. 22p.

Report of a study team of which Dr. Randhawa was a member. Arecanut and its production requirements; development during the first and second Five Year Plans. Recommendations to increase production through nurseries, plant protection, better irrigation and research.

OILSEEDS

Addresses and speeches

158 Adhaykashiya bhashan. Hyderabad, Commercial Printing Pr., 1957. 6p.

In Hindi. Address at the 10th annual general and 18th ordinary meeting of the Indian Oilseed Committee on January 25, 1957, held at Hyderabad..

159 Oilseeds. *In* his Trends in agricultural research. New Delhi, ICAR, [1956]: 32-37.

Excerpts from speech at the 17th ordinary meeting of the Indian Central Oilseeds Committee on March 31, 1956.

160 Oilseeds. *In* Trends in agricultural research. 2[1957] : 17-24.

Address at the 10th annual general and 18th ordinary meeting of the Indian Central Oilseeds Committee, on January 25, 1957.

161 Oilseeds. *In* Trends in agricultural research. 3[1958] : 79-94.

Speech at the 11th annual meeting and 19th ordinary meeting of the Indian Central Oilseed Committee held at Hyderabad, on March 19, 1958. Acreage and production, extension schemes, improved varieties, crushing industry and publications.

162 Oilseeds. *In* Trends in agricultural research. 4[1959] : 40-44.

Presidential address at the 12th annual general meeting of the Central Oilseed Committee held at Chandigarh on December 13, 1958.

163 "President's address at the 11th annual general and 19th ordinary meeting of the Central Oilseed Committee held at Hyderabad on March 19, 1958", *Indian Oilseed J.* 2(2) 1958 : 121-126.

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Acreage, production, extension schemes, improved varieties, crushing industry and publications.

GROUNDNUT

164 Study of groundnuts in India. Hyderabad, Indian Central Oilseed Committee, 1963. 90p.

Report of a study team, set up by the Planning Commission with which the author was associated as Adviser (Resources), Planning Commission. Groundnut farming in different states with special reference to first and second Five Year Plans. Problems of low yield and suggestions for improvement.

LAC

165 Lac. *In his* Trends in agricultural research. New Delhi, ICAR [1956] : 52-56.

Excerpt from speech delivered at the meeting of the Indian Lac Cess Committee.

AGRICULTURAL PRODUCTION

166 "Agricultural production in India", *Everyday Sci.* 6(3), 1959 : 1-4.

Increasing agricultural production through reclamation of wastelands, application of scientific method and use of fertilizers.

167 "Increasing agricultural production in India", *Nagpur agric. Coll. Mag.* 33(1), 1959 : 53-55.

——, *Bihar agric. Coll. Mag.* 10(1), June, 1959 (pub. 1961) 6-10.

——, *Dharwar Coll. Agric. Mag.* 13(1), 1960 : 1-7.

——, *Sci. and Cult.* 25(1), July 1959 : 31-33.

Increasing production through scientific methods of agriculture, use of fertilizers and breeding techniques.

168 "Increasing agricultural production in India", *Everyday Sci.* 10(3-4), Sep.-Dec. 1965 : 22-25.

Balancing population growth and food supply by tapping new sources of food, increasing the productiveness of the land and through research in scientific agriculture.

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169 "Green revolution in Punjab", *United Voice* 1(9), Aug. 15, 1969 : 12-13, 20.

Increase in agricultural production because of modern research and planning, including the role of the Punjab Agricultural University in bringing this revolution.

170 "Stepping up food production", *Kurukshetra* 9(1), Oct. 1960 : 36-38.

Increasing production through scientific methods, use of fertilizers and better breeding techniques.

AGRICULTURAL ECONOMICS

171 "Consolidation of holdings in the Punjab", *Kurukshetra* 2(9), June 1953 : 9-12, 16.

Contribution to a symposium on community development in India. Progress in consolidating small and fragmented holdings, covering almost all the sown area, in Punjab.

172 New agricultural taxes and the 'Green revolution' in India, by M. S. Randhawa and S. S. Johl. Ludhiana, PAU, 1969. 5p.

——, *Tribune*, March 19, 1969.

——, *Chronicle* (*Ludhiana*) *Punjab Kisan Mela no.* March 21, 1969.

The proposed wealth-tax, and its effect on the development of agriculture, and the aim of self-sufficiency in food.

173 "Role of the industry", *Prog. Fmg* 6(4) : Dec, 1969 : 3-4.

Adopted from the author's concluding address at the Zonal Seed Seminar, Chandigarh, October 1969. Establishment of the seed industry and the National Seed Corporation, and how to popularize good seeds through the government and agricultural universities.

174 Study on utilization of urban wastes. New Delhi, Planning Commission, 1963. 26p.

Report presented by the author who was Adviser (Resources), Planning Commission 1961-1964. Utilization of agricultural and industrial wastes for augmenting manure resources and building cleaner towns and cities.

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175 Survey and utilization of agricultural and industrial by-products and wastes. New Delhi, Planning Commissiom, 1963. 140p.

The author, who was Adviser (Resources) Planning Commission, 1961-1964, presented the report of survey by a working group. Utilization of wastes and by-products of agriculture, forestry, animal husbandry, fisheries and industries, most of which are potential source of raw materials for various industries.

INTENSIVE AGRICULTURE PROGRAMMES

Addresses and speeches

176 "Package programme : its achievements", *Times of India, agricultural research and development supplement*, Sep. 1965 : 3.

——,*Hindustan Times*, Jan. 5, 1965 : 1.

The intensive agricultural areas programme holds promise of narrowing the gap between food production and consumption, as has been shown through the pilot project in selected areas since 1960-1961.

177 "Package programme lives up to its promise", *Indian Fmg* n.s. 15(10), Jan. 1966 : 23-25.

Excepts from the welcome speech at the 5th Central Conference of key personnel of intensive agricultural areas, held at New Delhi, in December, 1965.

178 Progress and problems of intensive agricultural area. New Delhi, Farm Information Unit, Directorate of Extension, Ministry of Food & Agriculture, 1964. 24p.

Speech of the Director-General, Intensive Agricultural Areas, at the central conference of the key personnel connected with the intensive agricultural programmes, held from 7th to 10th October 1964, at New Delhi.

General

179 "Farm planning project under intensive agricultural district programmes in India", *Indian J. agric. Econ.* 20(3) July-Sep. 1965 : 1-12.

Planning for intensive cultivation, to reduce the gap between demand and supply on which the progress of the country depends.

180 "Intensification of agriculture : M. S. Randhawa's suggestions", *Times*

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of India May 25, 1965 : 7.

Suggestion for planning for intensive cultivation, including supply of improved seeds, fertilizers, implements credit and pesticides, to reduce the gap between supply and demand.

181 Intensive cultivation programmes. New Delhi, Farm Information Unit, Directorate of Extension, Ministry of Food & Agriculture, 1965. 64p Maps.

The author, who was Director-General, Intensive Agricultural Areas, surveys the 'Package Programme' undertaken on a pilot basis in selected areas in 1960-61.

182 "The philosophy and concept of intensive cultivation programme", *Intensive Agric.* 2(9-10), Nov.-Dec. 1964 : 5, 51.

Increase in agricultural output under the third Five Year Plan, through intensive methods of cultivation which can reduce the gap between supply and demand, on which the progress of the country depends.

183 "Punjab scheme to use urban wastes", *Indian Express* Jan. 5, 1965 : 3.

Its utilization explained at a press conference at Chandigarh in January 1965 by the author who was Director-General, Intensive Agricultural Programme and Adviser (Resources) Planning Commission. The scheme to be financed by the Centre, would bring more land, near Chandigarh, under vegetable cultivation.

184 "Sullage of 60 Panjab towns to be sold to farmers", *Tribune* Jan. 5, 1965 : 3.

Press conference at Chandigarh on January 2, 1965. Review of the progress of the Intensive Agricultural Programme in Punjab. Scheme for utilization of urban wastes; the sullage water of Chandigarh for fertilization 750 acres of land in the suburbs. Two schemes for reclamation, of land in Punjab, i.e., taming of Patiala and Khanpur '*chos*' and Sutlej river bed schemes and also rural electrification schemes.

185 "What has the package programme achieved", *Indian Fmg* n.s. 15(7) 1965: 24-25, 51.

The Intensive Agricultural District Programme, through the adequate supply of inputs like seed, fertilizers, pesticides, implements, credit and other facilities, has shown potentialities in increasing agricultural production.

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ANIMAL HUSBANDRY

Addresses and speeches

186 Animal husbandry. *In* Trends in agricultural research. 3[1958] : 75-79.

Welcome speech at the 12th meeting of the Animal Husbandry Wing of the Indian Council of Agricultural Research held at Simla, on June 17, 1957. Vital problems of livestock work.

187 Animal husbandry. *In* Trends in agricultural research. 4[1959] : 4-7.

Welcome speech at the 9th meeting of the Central Rinderpest Control Committee held on July 3, 1958. Review of the rinderpest eradication scheme since it was started as a pilot project in 1954.

188 "Rinderpest control programme", *Gosamvardhana* 6(5), Aug. 1958 : 18-19.

Address at the 9th meeting of the Central Rinderpest Control Committee. Review of the progress and difficulties in field-work in checking this dreaded cattle disease.

General

189 "Cattle improvement and dairy development ", *Indian Dairyman*, 8(5), 1956 : 119-121.

Comparison with other countires and the need for dairy development in India.

190 "Role of domesticated animals in India", *Everyday Sci.* 2(2), Jan. 1954 : 100-111.

An ecological study of the shaping of history by the various types of domestic animals used in India and those used by invaders and foreigners.

191 "Role of domesticated animals in Indian history", *Sci. and Cult.* 12(1), 1946 : 5-14.

Popular article on the general evolution of plants and animals and the world-wide distribution of domestic animals in ancient times. The dominant domestic animals in India were the elephant, the buffalo and the dog. The Aryan, displaced them with a horse-cow culture in circ. 1690 B. C.; though buffalo could not be completely replaced, because of its higher milk yield, etc. The camel consolidated the Arabian empire won on the horse.

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HORTICULTURE, ARBORICULTURE & LANDSCAPE PLANNING

Addresses and speeches

192 "Homage to S. B. Lal Singh", *Punjab Hort. J.* 8(1), Jan.-March, 1968 : 4-11.

Life and work of a distinguished horticulturist of Punjab.

193 Horticulture. *In* Trends in agricultural research. 3[1948] : 31-34.

Speech at the 3rd All-India Horticultural Research Workers' Conference, Simla, June 24-27, 1957. Remunerative and spiritual aspects.

194 "Horticulture is coming into its own", *Indian Fmg* n.s. 5(11), Feb. 1956 : 18-20.

Excerpts from a speech at the annual general meeting of the Horticultural Society of India held at New Delhi. Traces the plantation of ornamental and fruit trees from ancient times to the recognition of horticulture in the second plan. Establishment of Horticultural Division at the I.A.R.I., and fruits as supplementry diet for farmers of Punjab.

195 "Horticulture in India", *Everyday Sci.* 4(1), 1956 : 23-25.

——, *Madras agric. J.* 45(7), July 1958 : 268-272.

——, *Poona agric. Coll. Mag.* 49(1-2), June-Aug. 1958 : 103-106.

——, *Andhra agric. J.* 5(4), 1958 : 220-222.

Based on the inaugural address delivered at the annual meeting of the Horticultural Society of India on December 14, 1955, at New Delhi. Historical development from Vedic times to garden colony scheme of Punjab.

196 Memorial lectures in memory of S.B. Lal Singh. Chandigarh, Punjab Mail Pr. [1967] 10p.

Memorial lecture at the 'International Symposium on Subtropical and Tropical Horticulture' organized by the Horticultural Society of India at New Delhi, on December 14, 1967. Life and work of a great Director of Agriculture and a distinguished horticulturist, who played an important role in promoting horticulture in united Punjab and the development of agriculture in East Punjab, after partition.

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197 "Sardar Bahadur Lal Singh—a homage", *Prog. Fmg* 5(1), Sep. 1968 : 36-38.

Adapted from the memorial lecture at the 'International Symposium on Subtropical and Tropical Horticulture' organized by Horticultural Society of India, at New Delhi, in December 1967.

198 Welcome address. Simla, Himachal Pradesh Administration Pr., 1959. 5p.

Speech at the seminar on diseases of horticultural plants held at Simla on June 10, 1959. Nature of plant diseases and their implication in crop husbandry.

General

199 "The future of horticulture", *Gardening (U.P.)* 1(2), Sep. 1956 : 5-7.

Horticultural development in the second Five Year Plan.

200 "A gaint mango tree", *Indian Fmg* 10(6), June 1949 : 257-258.

A description, with illustration of gaint mango trees in Burail, tahsil Kharar, Ambala district which were threatened by the new capital of East Punjab proposed to be built there.

201 "What nutrition vegetables contain", *Indian Hort.* 10(2), Jan.-March 1966 : 5, 6, 16.

Nutritive contents of various groups of vegetables—leafy, fruit, seed, tuber and bulb vegetables.

LANDSCAPE PLANNING

202 Beautifying India. Delhi, Raj Kamal, 1950. 224p. 22 col. plates.

Art and bio-aesthetics of landscape gardening and planning. Includes a list of ornamental, flowering, foliage and shade trees with their description; Indian, English and botanical names, including gardening notes.

203 "A bio-aesthetic plan for India", *Curr. Sci.* 16(1), Feb. 1947 : 41-46.

Landscape planning based on concept of beauty and utility.

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204 "Brightening up New Delhi parks and avenues", *Indian Hort.* 3(1), Oct.-Dec. 1958 : 3-4.

Reprint of an article originally contributed to the *Statesman.* Efforts made to lay parks and avenues when New Delhi was being planned in 1911. Compromise between beauty and utility can be achieved by planting shady, flowering and fruit trees. Setting up of a landscape committee for Delhi, planning moonlight gardens and measures for checking stray cattle.

205 "Flowering trees that adorn New Delhi", *Indian Hort.* 3(4), July-Sep. 1959 : 3-4.

The capital's well-executed plan, including layout of New Delhi, showing what trees have been planted where.

GARDENS & GARDENING

206 "The gardens of calm and peace", *Indian Hort.* 2(4), July-Sep. 1958 : 3-7.

Japanese gardens and their Indian origin.

207 Ghar ke bagichi ki ruprekha, edited by M. G. Kamat. 2nd ed. New Delhi, ICAR, 1958. 20p. illus.

Plans for home gardens. Blending of beauty and utility by planting flowering, fruit and shady trees. In Hindi.

208 "Planning your home garden", *Indian Fmg* 7(3), March 1946 : 115-117 and 7(4), April 1946 : 162-168.

——,*Punjab Fruit J.* 10 (2), Oct. 1946 : 127-128, 133,

——.*In* Chandigarh, city of the rose. Chandigarh, Department of Public Relations and Cultural Affairs, Chandigarh Administration, 1959 : 4-9.

Combination of beauty and utility in home garden through plantation of hedges, fruit trees, fragrant and ornamental trees, in addition to common plants.

ARBORICULTURE

Address

209 Inauguration of the tree planting week. [Delhi], July 20, 1947, 14p.

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Manuscript of a speech in Hindustani, at the Purana Qila, Delhi, before an audience consisting of the members of the interim government, including Pt. Nehru, which marks the inauguration of the tree planting week in modern India.

General

210 Beautiful trees and gardens. New Delhi, ICAR, 1961. 276p. illus. (18 plates).

Revised and enlarged version of the author's *Flowering trees in India* issued in 1957. New chapters describing Hindu-Buddhist, Mughal, English and Japanese gardens have been added. Depicts the beauty of the gardens, the forests and the countryside of India, including landscape and country planning.

211 Beautyfying cities of India. New Delhi, ICAR, 1961. 21p.

A plea for wider use of ornamental trees, with practical recommendations and a list of 103 nurseries which can provide the material.

212 Bharat me pushpavrksha, translated by Devakinandan Paliwal. New Delhi, ICAR, 1961. 280p.

Hindi translation of his *Flowering trees in India.*

213 " Calendar of flowering trees", *Indian Hort.* 4(1), 1959 : 3, 27.

A calendar of trees, showing the flowering time of some of the trees, to have blooms round the year, as an aid to landscape planning.

214 Cult of tree and tree worship in Buddhist Hindu sculpture. New Delhi, All-India Fine Arts & Crafts Society, 1964. 66p. 55 illus.

——,*Roopa-Lekha* 33 (1-2), 1963 : 1-42.

Tree worship as the earliest form of the religious manifestation the world over. Buddhism and cult of tree worship as depicted in ancient sculptures, as also the present day practices.

215 "For blooms round the year plan your planting according to this calendar of flowering trees", *Indian Hort.* 4(1), Oct.-Dec. 1959 : 3, 27.

A calendar showing flowering time of some important flowering trees as an aid to to landscape planning.

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216 Flowering trees. 2nd rev. ed. New Delhi, National Book Trust, 1960. 205p. (India, the land and people).

A popular abridgement of his *Flowering trees in India* complied for the National Book Trust. First published in 1965.

217 Flowering trees in India. New Delhi, ICAR, 1957. 209. 19 col. plates.

"In this book painters, poets, administrators and horticulturists are met together in a festival of flowers". Provides both the incentive and technical "know-how" to town planners and all concerned with the layout of gardens, villages, public and private buildings and parks.

218 "Fragrant trees and and shrubs of northern India", *Indian J. Hort.* 3(1), June 1945 : 1-8.

——,*Indian Fmg* 8(2), 1947 : 158-161.

The sense of smell and a description of celebrated fragrant trees, hedges and creepers grown in India, along with their botanical names and gardening notes.

219 "Ornamental flowering, foliage and shade trees of northern India, *Indian J. Hort.* 3(2), Dec. 1945 : 56-85.

Indigenous trees and those that have been introduced from outside, for some of which there are no Indian names, and names were invented by the author. Exhaustive table of various trees, along with Indian, English and botanical names, and gardening notes.

220 Phool jade (Flowering trees), tr. by Vasantrao V. Vakli. New Delhi, National Book Trust, 1968. 212p. (India, the land and people).

Marathi translation of '*Flowering trees*'.

221 Phoolon wale per. New Delhi, National Book Trust, 1966. 193p. illus.

Hindi translation of his *Flowering trees* in the series "India, the land and people".

222 "Plant exploration and introduction services for India", *Indian Fmg* 7(10), Oct. 1946 : 448-451.

Trees and crops which have been introduced from outside, and the need for an organization for plant exploration and introduction.

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223 "Planting trees in villages", *Indian Fmg special no.* 1946 : 199-205.

Planting fruit, timber and fuel trees for the use of villages.

224 "Some odd and unusual trees", *Indian Fmg* 8(4), April 1947 : 197-198.

List of some unusual trees with their botanical, Indian and English names, including their description and gardening notes.

225 Sunder rukh te bagh bagicha, translated by Sohan Singh and e ited by D. Raghavan. New Delhi, ICAR, 1963. 302p.

Punjabi translation of his *Beautiful trees and gardens.*

226 "A tree plantation plan for India : II Avenues for town roads", *Indian Fmg* 7(10), 1946 : 498-504.

——,*Indian Forester,* 72, June 1946 : 267-271.

Poor use of flowering trees in India, inspite of their varieties. Directions for planting ornamental and fruit trees, their choice and colour schemes.

227 "Tree plantation plan of New Delhi", *Indian Fmg* 8(11), Nov. 1947 : 567-568.

Earlier attempts of Lutyens and others; including a model plantation plan.

228 "Tree plantation plan for northern India", *Punjab Fruit J.* 10 April 1946 : 61-64.

——,*Indian Fmg* 6(8), Aug. 1945 : 347-349 and 6(9), Sep. 1945 ; 394-397.

Bio-aesthetic planting plan, covering flowering fruit and timber trees. Importance of celebrating a tree plantation week.

229 Tree planting along railway lines for beauty and utility. New Delhi, ICAR, 1959. 38p. illus.

Planting of ornamental flowering trees as well as trees of economic value along railway tracks and raising of nurseries, with addresses of nurseries for securing the material.

230 "Trees and their habitat", *Indian Fmg* 7(May) 1946 : 230-233.

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Importance of the study of ecology of trees for the bio-aesthetic planner. Gives the ecological requirements of a number of ornamental trees, which are listed in groups for specific habitat.

231 Vanmahotsav, ed. by M. G. Kamat. New Delhi, ICAR, 1957. 16p.

In Hindi. Need and importance of celebrating tree plantation festivals in India and the way such festivals are organized in other countries.

232 Vriksh ropan aur dekhbhal, edited by M. G. Kamat. New Delhi, ICAR, 1957. 40p.

A plan for tree plantation in rural and urban areas in India. In Hindi.

NATIONAL PARKS

233 Rashtriya upwan, translated (in Hindi) by M. G. Kamat. New Delhi, ICAR, 1957. 24p. illus.

Growth of national parks in foreign countries and in India. Need for a new policy for conservation of national resources including the establishment of a central biological services and legislation for preservation of wild life in India.

CHANDIGARH

Addresses and speeches

234 Remarks. *In* Museum and Art-Gallery, Chandigarh. Chandigarh, Union Territory Administration, 1968. 12p.

Speech at the inaguration of the Chandigarh Museum and Art Gallery, on May 6, 1968.

235 Welcome address. Chandigarh, Chandigarh Administration Press, 1976. 8p.

Welcome address on the inauguration of the Defence Colony, Chandigarh on September 11, 1967 by S. Swaran Singh, Minister for Defence.

236 Welcome address. Chandigarh, Union Territory Administration, 1967. 7p.

Address of welcome to Dr. Zakir Hussain, President of India, on the inauguration of the laboratories and workshops of the Central Scientific Instruments Organization, Chandigarh, December 28, 1967.

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General

237 A brief review of the work done in Chandigarh since Nov. 1, 1966. Chandigarh, Union Territory Administration, 1967. 12p.

238 Chandigarh. Chandigarh, Union Territory Administration, 1968. 87p. illus.

Development of Chandigarh from its foundation to December 31, 1967.

239 "Chandigarh : the problems of a growing city", *Tribune*, Nov. 1, 1966 : 4.

——,Ambala, Tribune Pr., 1966. 6p.

Reviews how the landscape plans and the architectural design have transformed Chandigarh into the most beautiful city of India where nature and man's creation are harmoniously blended.

240 Edict of Chandigarh. Chandigarh, Union Territory Administration, 1967. 3p.

The basic principles of city planning as approved by the Capital Board of the Union Territory.

241 Hints for the builders at Chandigarh regarding facilities and services available. Chandigarh, Union Territory Administration [1966] 12p.

——,*In* Souvenir of the Chandigarh Festival 17th to 29th October, 1967. Chandigarh, Festival Committee and Chandigarh Administration, 1967 : 58-62.

Guidelines for builders at Chandigarh in getting material, loans and other facilities.

242 "Landscaping Chandigarh", *Indian Fmg* n.s. 6(1), 1956 : 43-48.

——,*Indian Hort.* 1(1), Oct. 1956 : 43-49.

——,*Indian Hort.* 12(1), Oct.-Dec. 1967 : 3-8.

——,*In* Souvenir of the Chandigarh Festival Oct. 27-29, 1967. Chandigarh, Festival Committee and Chandigarh Administration, 1967 : 19-29.

Analysis and classification of the problems of landscaping and tree planting in

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Chandigarh into three categories; (1) the urbanistic elements which require tree planting; the manner and arrangement of trees, (2) the architectural disposition of the elements of tree planting; and (3) the selection of trees and their classification according to the shape of the crown and colour of flowers. Illustrated by Le Corbusier.

243 Remarkable progress or the 'City Beautiful'. *In* Souvenir of the Chandigarh Festival October 27 to 29, 1967. Chandigarh, Festival Committee and Chandigarh Administration, 1967 : 7-14.

Work done in Chandigarh since it became a union territory on November 1, 1966. Tempo of development has generated optimism and re-estiblished confidence regarding the future of the city.

RURAL DEVELOPMENT, COMMUNITY PROJECTS AND EXTENSION WORK

RURAL DEVELOPMENT

244 "Brightening the villages", *Kurukshetra* 4(1), Oct. 2, 1955 : 38-41.

Games, folk-songs, folk-dances of rural Punjab and Kangra, and how they can check exodus from the rural areas to the towns.

245 Developing village India : studies in village problems, edited by U. N. Chatterjee. Rev. ed. Calcutta, Orient Longamans, 1951. 290p.

Published under the authority of the ICAR. Sections include agriculture and nutrition, animal husbandry, cottage industries, sanitation and health, education and culture.

246 "Health and sanitation problems", *Indian Fmg special no.* 1946 : 237-241.

Need for cleanliness in the rural areas to get rid of dirt, disease and epidemics.

247 "Model villages in Punjab", *Indian Fmg n.s.* 1(10), Jan. 1952 : 12-16.

The types of rural housing and villages that developed through planning after the destruction of the country-side and the migration following the partition of Punjab.

248 "Organisations for developing village India", *Indian Fmg special no.* 1946 : 32-38.

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Role of voluntary village organizations in community and national extension development.

249 Panchyatghar. Lucknow, Govt. Branch Pr. [1938]. 29p.

In Hindi. An illustrated account of the organization of Panchayatghars in rural areas and the development of the institution in U.P. since the programme was inaugurated in 1938.

250 "Panchayatghar institution", *Indian Fmg special no.* 1946 : 60-65.

Illustrated account of the role of Panchayatghars in rural development in U.P. since the programme was inaugurated in 1938.

REHABILITATION

251 Garden colonies in Punjab. Simla, Public Relations Department, Punjab [1951]. 26p. illus.

——,*Indian Fmg n.s.* 1(7), Oct. 1951 : 24-25 and 1(8), Nov. 1951 : 23-25.

Scheme of 27 garden colonies, which could add about 20,000 acres to gardens of Punjab, as a feature of the resettlement operation in the state. Establishing so many garden colonies was due to the reason that rich orchards and gardens were lost to Pakistan during partition. The colonies will also serve as centres of agricultural and social advancement.

252 Out of the ashes. Chandigarh, Public Relations Department, Punjab, 1954. 229p.

Account of the rehabilitation of refugees from West Pakistan in rural areas of East Punjab, following partition.

EXTENSION WORK

253 "Campaigns, drives and weeks", *Indian Fmg special no.* 1946 : 81-82.

Drive for self-sufficiency in food and social welfare.

254 "How extension came to India", *Extension* 1(2), Apr. 1956 : 5-6, 9.

Development of extension through the work of the two pioneers, F. L. Brayne, an official and Mahatma Gandhi, and the programme launched in U.P. during 1937-1939; including development following the partition of 1947.

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255 "Extension training programmes", *Madras Agric. J.* 43, 1956 : 346-350.

——,*Agric. Osmania Univ.* 4, 1956-57 : 1-4.

——,*Kurukshetra* 4(11), Aug. 15, 1956 : 29-32.

——,*Coll. Agric. Dharwar Mag.* 10(1), 1957 : 33-36.

——,*Bihar agric. Coll. Mag.* 8(1), 1957 : 19-22.

——,*Allahabad Fmr* 31(2), March 1957 : 29-33.

——,*Coll. Agric. Mag. Banaras Hindu Univ.* 1(1), 1956-57 : 20-30.

——,*Extension* 1(4), Oct. 1956 : 14-16.

Training of village workers who form the backbone of the whole programme of intensive rural development envisaged in the first and second Five-Year Plans.

256 National extension service and community projects. Chandigarh, Community Projects Administration, 1955. 303p.

Objectives of community development programme and information for preparing programmes. Also discusses consolidation of holdings, rural housing, health and sanitation, agriculture and animal husbandry.

257 National extension service and community projects in Punjab. Chandigarh, Commmunity Projects Administration, 1955. 303p. illus.

For the guidance of the field staff in community projects development programmes. Administration and organization of community projects including consolidation of holdings, rural housing, social education and animal husbandry.

FOLK-LORE

258 Phulmon te Ranjhu. *In* M. S. Randhawa Abhinandna Granth. Delhi, Navyug, 1969 : 162-166.

In Punjabi. A tragic love story of a Gaddi women.

259 Preet Kahaniya. Jullundur, Hind Pub. 1957. 173p. illus.

Compilation of famous love tales of Punjab, including *Heer-Ranjha*. In Punjabi.

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FOLK-SONGS

260 Baramasa. Chandigarh, Punjab Public Relations Department [1954]. 9p. illus.

Reprint from *Advance* October 1954. The pageant of twelve months of the Hindu calendar in northern India.

261 "Folk songs from Kumaon", *The Himalayas* 1(1), 1952? : 77-79.

Influence of environment as an outstanding feature of the Himalayan folk-songs. Songs and dances from Darma noted for its women's club 'Rangbang' which become a centre of merrymaking by women and young girls when men folk are away.

262 Haryana de lok geet. Delhi, Attar Chand Kapoor, 1956. 154p.

Popular folk-songs of a region which was once a part of Punjab. In Punjabi.

263 Haryana ke lok geet. Delhi, Attar Chand Kapoor, 1956.

Hindi version of the above.

264 Kangra de lok geet. Delhi, Attar Chand Kapoor, 1954. 193p.

Popular folk-songs from Punjab hills, now included in Himachal Pradesh. In Punjabi.

265 Kangra ke lok geet. Delhi, Attar Chand Kapoor, 1954.

Hindi version of the above.

266 "Kangra lok geet de mukh lachhan", *Pritam* 40(1), 1962 : 45-48.

Main characteristics of the folk-songs of Punjab hills, now included in Himachal Pradesh. In Punjabi.

267 Kulu de lok geet. Delhi, Attar Chand Kapoor, 1955.

Folk-songs of the *gaddis* of Himachal Pradesh. In Punjabi.

268 Kulu ke lok geet. Delhi, Attar Chand Kapoor, 1955. 163p.

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Hindi version of the above.

269 Punjab de lok geet. Ludhiana, Sahitya Sangam Pub., 1954.

Folk-songs, in Punjabi.

270 Punjabi lok geet. New Delhi, Sahitya Akademi, 1960. 599p.

Jointly with Davinder Satyarthi. Hindi version of the above.

271 "Rutan", *Jagriti* Sep. 1958 : 1-10.

The seasons during the twelve months according to the Hindu calendar. In Punjabi.

RURAL ARTS & CRAFTS

272 Phulkari. New Delhi, Publications Division, Government of India. 40 col. plates.

A study of the art of embroidery as prevalent in Punjab.

PAINTING

273 Indian painting; the scene, themes and legends. New York, Houghton Mifflin, 1969. 142p. illus.

Thirty-five paintings, from the 16th to 19th century, with commentary and notes on their patron. Written jointly with John Galbraith, former US Ambassador in India.

RAJPUT PAINTINGS

274 "Paintings in Bundi", *Roopa-Lekha* 35(1-2), 1965 : 6-14.

Murals from the palace fort in Bundi (Rajasthan) celebrated as one of the centres of Rajput art; depicting darbar scenes, daily life of queens and princesses, including stories from Bhagvata Purana.

275 "Reassessment of some paintings described in Gongoly's Masterpieces of Rajput Paintings", *Lalit Kala* 3-4, 1956-57 : 96-101.

A new interpretation of some paintings from the famous album of O.C. Gongoly, published in 1926.

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KANGRA & ALLIED SCHOOL OF PAINTING

KANGRA PAINTING

276 "Kangra art of painting; a visual expression of a culture". *In* Essays presented to Sir Jadunath Sarkar. Hoshiarpur, Department of History, Punjab University, 1958 : 252-258.

Social amd cultural movements in northern India from the mediaeval times. Kangra art seen as the flowering of the Aryan culture of the North, in the same way as the Ajanta art was the flowering of the Dravidian culture of the South.

277 "Kangra artists", *Art and Letters*, 1955 : 19-29.

——,*Roopa-Lekha*, 37(1), 1956 : 4-10.

Seu, Manak, and Nainsukh amongst others.

278 "Kangra kala de khoj da pichokar", *Jagriti* 8(11), Nov. 1961 : 5-9.

The search for the art of Kangra and the picturesque surroundings which inspired this school. In Punjabi.

279 "Kangra paintings illustrating the life of Shiva and Parvati", *Roopa-Lekha* 24(1), 1953 : 23-29.

Hundred and ten paintings of the legends from Shiva Purana as painted by the court painter of Maharaja Sansar Chand of Kangra.

280 Kangra paintings of the Bhagvata Purana. New Delhi, National Museum, 1960. 99p. 30 plates (20 col.).

Interpretation of the rare and scattered masterpieces of the Bhagvata Purana series of Kangra paintings, representing the Kangra art at its best. Exhaustive introduction and detailed notes.

281 Kangra paintings of the Bihari Satsai. New Delhi, National Museum 1966. xi, 87p. 39 plates.

The famous seven hundred verses of the great Hindi poet as illustrated in the Kangra paintings. Includes transcription in Roman with translation in English and interpretation of the paintings.

282 Kangra paintings of the Gita Govinda. New Delhi, National Museum,

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1964 : 132p. 39 plates.

——,*Bhavan's Journal* 9(1), Aug. 1962 : 1-6.

The great Sanskrit epic of Jayadeva dealing with the life and loves of Krishna as illustrated in the Kangra paintings.

283 Kangra paintings on love. New Delhi, National Museum, 1963. 209p. 115 plates (26 col.).

——,*Studio*, Sep. 1954.

Erotic themes in Kangra paintings based mainly on the *Rasikapria* of Keshav Das. Selection covers the centres of paintings in Punjab Himalayas from a number of private and public collections. Extensive notes on the paintings which include the reproduction of the inscribed verses and their translation.

284 Kangra Ragamala paintings. New Delhi, National Museum, 1970. 80 plates.

——,*Roopa-Lekha* 29(1-2), 1958 : 4-30.

'Musical modes' as depicted in Kangra paintings, probably painted during the reign of Maharaja Sansar Chand (1766-1823).

285 The Kangra School. *In* Panorama of Indian painting. New Delhi, Publications Division, Government of India, 1968 : 25-28.

Kangra paintings which the author first saw in 1932 at Lahore Museum, and how the art reached the Punjab hills in the 18th century following the sack of Delhi in 1739.

286 Kangra valley paintings. New Delhi, Publications Division, Government of India, 1954. 18p. 40 plates.

A selection of paintings of the famous school which flourished in Kangra, Himachal Pradesh, in 18th century on the decline of the Mughal art.

287 "Kangra valley school of paintings", *Art and Letters* 28, 1954 : 1-9.

A brief account of the famous school of painting which flourished in Kangra, Himachal Pradesh, in the 18th century.

288 Krishna legend in Pahari paintings. New Delhi, Lalit Kala Akademi, 1956. 30p. 12 plates.

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The life and loves of Krishna as depicted in Kangra paintings.

289 "Maharaja Sansar Chand, the patron of Kangra paintings", *Roopa-Lekha* 32(2), 1962 : 1-30. col. plates.

Life and work of Maharaja Sansar Chand (1766-1823) of Kangra, the great patron of paintings of Kangra.

290 "Manak, painter of Gita Govinda : was he a Garhwal artist?", *Roopa-Lekha* 31(2), 1960 : 3-9.

The celebrated painter who illustrated the famous Sanskrit love poem is shown to be a native of Kangra in view of the style of his paintings.

291 "Moonlight in Kangra paintings", *March of India*, Mar.-April 1954.

The pale light of the moon and its silvery beams, and its effect on lovers, as painted by the Kangra artists.

292 "Some inscribed Pahari paintings with names of artists", *Roopa-Lekha* 29 (1-2), 1959 : 27-30.

293 "Sujanpur Tira, the cradle of Kangra art", *Marg* 7(3), 1954 : 21-36. 15 plates.

The town in Himachal Pradesh, and a brief history of its Katoch rulers, with special reference to Maharaja Sansar Chand (1766-1823) his life and love for paintings. His age called the Golden Age of Kangra.

BASOHLI PAINTINGS

294 Basohli paintings. New Delhi, Publications Division, Ministry of Information and Broadcasting, India, 1959. 125p. 40 plates.

A survey of the school of painting which flourished in Basohli, now a small township in Jammu and Kashmir, in the 19th century, including a representative example of these paintings.

295 "Basohli paintings of Bhanudatt's Rasamanjari", *Roopa-Lekha* 36(1-2), 1966 : 1-124.

Miniature paintings from Basohli made as illustrations to the celebrated Sanskrit poems on heroes and heroines.

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296 "Note on Rasamanjari paintings from Basohli", *Roopa-Lekha* 31(1), 1960 : 16-26.

Ten paintings on *Nayak-Nayika Bheda* (Secrets of hero and heroine) based on Bhanudatta's Rasamanjari written in the 15th century and painted by the artists employed by Raja Kirpal Pal of Basohli. Includes English translation of the original verses.

297 "Some portraits of the rajas of Basohli in Kangra style", *Roopa-Lekha* 34(1-2), 1964. 5-8.

Raja Kirpal Pal, Dhiraj Pal, Medini Pal, and others who ruled during the 18th century.

GULER PAINTINGS

298 "Guler; birth place of Kangra art", *Marg* 6(4), 1953 : 30-44.

An illustrated account of the hill state in Kangra valley, which flourished during the Mughal period with capital at Haripur, and was one of the earliest centres of art in the Kangra valley.

299 "Guler chiterlekha da itihas", *Arsi* 4(10), Feb. 1962 : 30-40.

A short account of Guler art in Punjabi.

CHAMBA PAINTINGS

300 Chamba paintings. New Delhi, Lalit Kala Akademi, 1967. 15, 11, xip. 20 plates 12 col. (Lalit Kala series of Indian art).

Interpretation of paintings from Chamba, a town situated in the north-west of Himalayas and named after Champavati, a daughter of Raja Sahila Varman, *circ.* 10th century.

301 "Chamba paintings", *Roopa-Lekha* 37(1-2), 1968 : 7-17.

Classifies Chamba paintings into four phases; Basohli, 1720-1764; Chamba, 1770-1808; Sikh, 1820-1850 and revivalist phase during the middle of 19th century. How for lack of appreciation and patronage the old tradition of miniature paintings declined with the death of Tara Singh in 1871.

OTHER KANGRA VALLEY SCHOOLS

302 "Eight nayikas from Arki", *Times of India Annual*, 1962.

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Types of heroines as painted by the artists from Arki, a small town north-west of Simla.

303 "Paintings from Arki", *Roopa-Lekha* 32(1), 1961 : 5-26.

Paintings which can be classified into three groups : Basohli, Kangra, and Sikh.

304 "Paintings from Mankot", *Lalit Kala* (6), 1959 : 72-75; 7 plates.

Introduces some paintings from Mankot now known as Ramkot, in the Jasrota district, Jammu.

305 "Paintings from Nalagarh", *Lalit Kala* (1-2), 1955-56 : 81-86 illus.

Some paintings from one of the Simla Hill States including those of Hari Singh, a Rajput, and Narsingh Das, a Brahman, who worked from 1788-1857.

306 "Signed paintings of Jawala Ram, artist of Garhwal", *Roopa-Lekha* 32(2), 1961 : 51.

A note on three paintings, painted during the earlier part of the 19th century, bearing the name of the artists, from the collection of Raja of Nurpur, in Himachal pradesh.

307 "Some Nurpur paintings", *Marg* 8(3), 1955 : 19-25.

Paintings of a school of art which once flourished at Nurpur (Himachal Pradesh) and differs from other hill schools in brilliance of its colour schemes and more frank handling of erotic themes.

MODERN PAINTINGS AND PAINTERS

308 "The art of Bireswar Sen. *In* his "The Himalayas". New Delhi, Dhoomi Mal Dharam Das, 1949 : 1-5.

——, *Roopa-Lekha* 22(1), 1948 : 22-25.

Biography and the work of a Bengali artist living in Lucknow, known for his miniature landscapes.

309 Art of E. H. Brewster and Achsah Brewster. New Delhi, Dhoomi Mal Dharam Dass, 1944. 58p. 19 plates (3 col.).

Life and art of the American couple who lived at Almora in the Kumaun hills.

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310 Art of Damayanti Chawla. New Delhi, Dhoomi Mal Ram Chand, 1956. 21p.

Paintings of a living lady artist.

311 Art of Jyotish Bhattacharya, 1965.

Out of print.

312 Art of R. Sarangan, 1966.

Out of print

313 The art of Sushil Sarkar. New Delhi, Dhoomi Mal Dharam Das, 1947. 21p. 16 col. plates.

An interpretation of some of the paintings of a Bengali artists now keeper of the Museum and Art Gallery, Chandigarh.

314 Himalaya—Bireswar Sen. New Delhi, Dhoomi Mal Dharam Das, 1967 : 24p. 19 col. plates.

An introduction to a series of paintings in water-colours of the Himalayas, made by a modern artist known for his miniature landscapes.

315 "M. K. Bardhan", *Roopa-Lekha* 33(1-2), 1963 : 78-82. 8 plates.

An introduction to the paintings of a young refugee artist from East Pakistan, including reproduction of his eight paintings depicting misery and squalor.

316 "Svetoslav Roerich", *Roopa-Lekha* 32(1), 1961 : 1-4.

Editorial. Introduces some of the paintings of the Russian painter now settled in Kulu, Himachal Pradesh.

LITERATURE

Anthology

317 An anthology of great thoughts. Delhi, Atma Ram, 1962. 58p.

Collection of inspiring quotations.

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PUNJABI LITERATURE

318 "Puran Singh; poet or mystic", *Sahitya Samachar Puran Singh no.* 1955. 1-8.

Life and work of the great Punjabi poet.

319 Puran Singh; Jeevan te kavita (Punjabi). New Delhi, Sahitya Akademi, 1965. 444p.

Life and poetry of the great poet of Punjab.

320 "Puran Singh di Vartak (Punjabi). New Delhi, Sahitya Akademi, 1967.

Commentry on his prose writing.

TRAVELS

TREK TO THE HIMALAYAS

321 "A trek through the Himalayas I : Almora to Binsar", *Pioneer special hill no.* May 20, 1953.

First of a series of articles contributed to the well-known Lucknow daily. The author who was the joint magistrate of Almora during 1938-39 made an extensive trip of the Kumaun region. Describes the trek from Almora to Binsar, once the summer retreat of the rulers of Kumaun; his meeting with Brewesters, the American artists, and his coming across a fountain in the hills built by the Nehru family.

322 "A trek through the Himalayas II : Gananath and Dewaldhar", *Pioneer magazine section* May 24, 1953.

The second article describes his trek from Binsar through the dense *chir* forest; his discovery of a new alga Sirocladium found growing at the mouth of a cave near the waterfall in Gananath. After a halt in guest-house of the hill estate of Dewaldhar the journey is continued towards Bageshwar.

323 "A trek through the Himalayas III : Bageshwar the town of Shiva", *Pioneer magazine section* 31 May, 1953.

Visit to a prosperous trading centre in the hills and to a 15th century temple there. Meeting with interesting people, including a guide and a donation-seeker.

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324 "A trek through the Himalayas IV : From Bageshwar to Kapkot", *Poineer magazine section* June, 7 1953.

Journey through the perilous Sarju valley to the more hospitable Kapkot, with its bungalow, shady trees and paddy fields. Meeting with interesting hill tribes; and tips on photography.

325 "A trek through the Himalayas V : Happy and hospitable village of Loharkhet", *Poineer magazine section* June 14, 1953.

Description of a little village in the Himalayas and the magnificent spirit of hospitality of the inhabitants and his meeting with other travellers.

326 "A trek through the Himalayas VI : Dhakuri and Khati ridges", *Poineer magazine section* June 21, 1953.

The steep climb from Loharkhet to the Dhakuri pass and the sudden descent to the other side; Khati, the last village on the Pindari route.

327 "A trek through the Himalayas VII : charming landscape around Phurkia", *Pioneer magazine section* June 28, 1953.

Stay at a dak-bungalow at an elevation of more than 3,000 meters, and his finding a very interesting log-book there, dating from 1893.

Pindari Glacier

328 "The heroes of Pindari glacier", *Pioneer* Nov. 2, 1955.

Visitors to the glacier as heroes and record breakers and the hazards one meets on the way. Some queer visitors and the chawkidar of the Phurkia dak-bungalow who inspires the visitors.

329 "The Pindari glacier I : Tips to intending visitors", *Pioneer magazine section* Aug. 30, 1953.

First of a series of articles, contributed to the well-known Lucknow daily, on his trek to the famous glacier in the Kumaun during 1943. Tips include excerpts from notes recorded by visitors as also the need for an early start. Gives a geographical and a geological descrption of the glacier.

330 "The Pindari glacier II : Conflicting views about the snout", *Pioneer magazine section* Sep. 6, 1953.

The snout of the glacier which had been the object of many adverse comments, and

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the various ice caves found near it.

331 "The Pindari glacier III", *Pioneer magazine section* Sep. 13, 1953.

The landscape around Phurkia dak-bungalow on way to the glacier.

332 "The Pindari glacier IV : Tributes from visitors", *Pioneer magazine section* Sep. 20, 1953.

Tributes, including those from a group of Japanese mountaineers, recorded in the log-book maintained at Phurkia dak-bungalow located at about 3,000 meters above the sea-level.

333 Pindari glacier 1943. 3 pts. 188p. illus.

Typescript in the library of Museum and Art Gallery, Chandigarh. Journey to the glacier, its description and the list of plants recorded.

PLACES

334 "Baijnath", *Arsi* (Punjabi) 4(9), Oct. 1961 : 25-28.

Description of the beautiful small town on the way from Kangra to Kulu in Himachal Pradesh.

335 "Divine justice in Kumaon", *Pioneer magazine section* Oct. 9, 1953.

A temple in the court compound at Almora, U.P., which is popular with the litigants and other people seeking divine intervention to their cause.

336 "Hill stations of central Himalayas", *Pioneer hill supplement* 1953 : 7-8.

Development of the hill-stations and resorts under the British in the early 19th century, including the author's motor journey through picturesque hills in U.P., and his meeting with the well-known Hungarian artists Sass Brunner and her daughter Elizabeth Brunner.

337 "Journey to Basohli", *Roopa-Lekha* 28 (1-2), 1958 : 14-24.

Journey by the author in 1957, to the place which has lent its name to a school of painting which preceded the Kangra school in the hills of Punjab and Jammu.

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338 Kulu vadi. Delhi, Attar Chand Kapoor, 1955. 154p.

An aesthete's view of Kulu valley, Himachal Pradesh. In Punjabi.

339 "Nagrota", *Chetna* 7(7), Oct.-Dec. 1961 : 37-40.

Account of a little-known township in Kangra district, Himachal Pradesh, remarkable for its lush landscape. In Punjabi.

Hill-Folks

340 "Aajari (Gaddi)", *Kavita* Oct. 1961 : 30-35.

Shepherds of Kangra and their surroundings. In Punjabi.

341 "Crime and confession in Kumaon", *Pioneer* Dec. 11, 1955.

The district courts, crimes and criminals of Almora, U.P., where the author was posted as joint-magistrate during 1938-39.

342 "Gods and ghosts in retreat", *March of India* 1953 : 43-46.

How scientific enlightenment and modern medical aid is overthrowing the superstitions and beliefs of the hill folks of Kumaun.

343 The Man. *In* Kumaon souvenir : the face and the spirit. Almora, Jiwan, publisher Kumaun Souvenir, 1958 : 10-24.

Reviews how the life of the people of Kumaun hills, U.P. in the four different zones differs and is conditioned by the altitude.

HISTORY AND CULTURE

344 "Desiccation of central Asia and invasions of India", *Everyday Sci.* 1(1), Oct. 1952 : 41-43.

Droughts and climatic changes as a contributing factor to invasions of India by Aryans, through Kushans and Huns to Timur and Babar. Includes reference and gives "some crucial dates".

345 "Progressive desiccation of northern India in historical times", *J. Bombay*

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nat. Hist. Soc. 45(4), 1945 : 558-565.

——, *Indian Forester* 78 (10), 1952 : 497-505.

Based on the study of ornamental trees of ancient India, as depicted in the sculpture. The author co-relates the periods of invasions with droughts, taking the Brij of Krishna legend and the evidence from sculptures to support the hypothesis.

KANGRA

346 Kangra. New Delhi, Sahitya Akademi, 1963. 421p.

Study of art, culture and people of Kangra hills. In Punjabi.

347 "Kangra", *Jagriti* (Hindi) 15(1), Jan. 1962 : 20-24.

——, *Jagriti* (Punjabi) 8(12), Dec. 1961 : 3-7.

Brief history and description of Kangra including account of some artists.

PUNJAB

348 Mera pind. *In* M. S. Randhawa [Abhinandan Granth]. Delhi, Navyug, 1969 : 167-172.

In Punjabi. Description and reminiscences of the author's native village Bodal, in tehsil Dasuya, district Hoshiarpur (Punjab).

349 Mukhbandh. *In* his Punjab. Patiala, Bhasha Vibhag, 1960 : 1-4.

Introduction to the book on history, art and culture of Punjab. In Punjabi.

350 Punjab; itihas, kala, sahitya te sabhiyachar. Patiala, Bhasha Vibhag, 1960. 560p. illus.

Comprehensive survey of history, art, literature and culture of Punjab. Includes contribution of many well-known writers. Edited by M. S. Randhawa.

BIOGRAPHIES

351 "Commemoration of Jawahar Lal Nehru", *Roopa-Lekha* 34(1-2), 1964 : 2-4.

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How the memory of Pandit Nehru can be perpetuated through new efforts and endeavours in various fields.

352 "Prof. S. L. Ghose (1893-1945)", *J. Indian bot. Soc.* 24, Aug. 1945 : 163-165.

In memory of Prof. Ghose, an algologist of India, known for his observations on blue-green algae of Burma and Punjab.

353 "M. O. P. Iyengar, some reminiscences", *Phykos* 5(1-2), 1966 : 1-6.

Life and work of a great algologist of India, and retired professor of botany, Madras University who discovered *Fritschiella tuberosa* and wrote a number of papers on algae of South India.

354 Some impressions. *In* Sardar Partap Singh Kairon, ed. by Mubarak Singh. Ludhiana, Kairon Abhinandan Granth Committee [1963] : 72-76.

Contributed anonymously to the Pratap Singh Kairon Festschrift. Reviews the qualities of one of the makers of modern Punjab with whom the author was associated for sometimes as the Development Secretary.

MISCELLANY

355 Hallmark of an educated man. Chandigarh, State Institute of Education, 1968. 10p.

Address on the fourth Foundation Day of the State Institute of Education celebration on April 25, 1968. Draws attention to some basic issues and offers suggestions which can pull education out of the present malaise.

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APPENDIX I

ARTICLES ABOUT DR. M. S. RANDHAWA

1 ANAND, MULK RAJ. "Letter to a friend", *Roopa-Lekha* 38(1-2), 1969 : 43-46.

Review of the life and work of Dr. Randhawa in the form of a letter.

2 ANAND, MULK RAJ. *Khat ek dost de nam. In* M. S. Randhawa abhinandan granth, Delhi, Navyug, 1969 : 151-155.

A Punjabi translation of the author's 'Letter to a friend'.

3 ANANT SINGH. "A visit to the Garden House, Kharar", *Roopa-Lekha* 38(1-2), 1969 : 30-39.

An account of the picturesque house which Dr. Randhawa has built for himself near Chandigarh, with an account of his family life, illustrated with photographs.

4 ARCHER, W. G. "The master of the Kangra Bhagavata Purana", *Roopa-Lekha* 38(1-2), 1969 : 64-72.

How Dr. Randhawa developed his love for Kangra art and how he came to publish the celebrated collection of paintings; with some notes about the artists.

5 ARCHER, W. G. "A tribute to M. S. Randhawa", *Roopa-Lekha* 38(1-2), 1969 : 47-63.

Review of the contribution by Dr. Randhawa to the knowledge of Kangra art, by the Keeper of the Indian section of the Victoria and Albert Museum, including the correspondence between the two on art.

6 BAKHSHI, BIMLA. *Saraswatian da mandir. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 156-158.

In Punjabi. Dr. Randhawa's residence at Kharar (Punjab) compared to the temple of the Goddess of learning. The contribution of Mrs. Randhawa in the life of her husband.

7 BALBIR SINGH. *Randhawa kaun hai ? In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 159-161.

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In Punjabi. Dr. Randhawa, who is he ? A man of action and wisdom.

8 BALGAN, KARTAR SINGH. *Punjabi sabiyachar da ashak. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 109-110.

In Punjabi Dr. Randhawa as a saviour and lover of Punjabi culture.

9 BALI, A. N. Origin of the Jat tribes of Punjab. *In* Glimpses of Punjab's history. Delhi, A. N. Bali, 1955 : 64-95.

A detailed account of the family and life of Dr. Randhawa, his early struggles, his success in the I.C.S and his role as one of the makers of modern Punjab.

10 BEDI, SOHINDER SINGH. *Lok geetan da rasia. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 82-85.

In Punjabi. Dr. Randhawa, lover and patron of folk-music and Kangra art.

11 DUGGAL, KARTAR SINGH. *Bhakhre de rah wich Bhakhra. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 77-81.

In Punjabi. Dr. Randhawa's house at Kharar near Chandigarh, on the way to Bhakhra, to which a visit can be a unique experience.

12 GALBRAITH, JOHN KENNETH. Introducion, *Roopa-Lekha* 38(1-2) 1969 : 9.

Tributes to "an extraordinary man" whose mind has "ranged over nearly the whole sphere of knowledge of science and art, from soil conservation to botany, to city management, history, religion, architecture and art", by the former U. S. Ambassador to Inida.

13 GALBRAITH, JOHN KENNETH. *Pravesh. In* M. S. Randhawa abhinandan granth, Delhi, Navyug, 1969 : 9-10.

In Punjabi. Introductory comments.

14 GALBRAITH, JOHN KENNETH. *Dr. Randhawa samkalia di nazar wich. In* Sahitayakar Dr. M. S. Randhawa nu sanman. Chandigarh, Bhasha Vibhag, Punjab, 1969 : 3.

In Punjabi. Tribute by the former U. S. Ambassador in India.

15 GOPAL SINGH. "A renaissance man", *Roopa-Lekha* 38, 1969 : 20-21.

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Dr. Randhawa as an administrator and the work he did for the Punjabi refugees.

16 GURBAKSH SINGH. *Sarab-pankhi pratibha da soma. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 86-88.

In Punjabi. Dr. Randhawa as an embodiment of virtues.

17 GURDIT SINGH. *Ek gunwan shakhsiat. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 55-62.

In Punjabi. Dr. Randhawa, who remains so modest and unassuming, inspite of his genius and many-sided activities.

18 HARCHARAN SINGH. *Punjab ata Punjabi sanskriti da usria. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 89-92.

In Punjabi. Dr. Randhawa as a patron and lover of Punjabi art and culture.

19 KUSHWANT SINGH. *Ek chittar. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 148-150.

In Punjabi. Dr. Randhawa, the first Sikh to qualify for the Indian Civil Services representing a rare combination of many virtues.

20 KUSHWANT SINGH. "A profile", *Roopa-Lekha* 38(1-2), 1969 : 40-42.

How the great Punjabi author came to meet Dr. Randhawa during the dark days of 1947, and the ripening of this contact.

21 KAUL, M. M. "A visit to no. 7 Trimurti, New Delhi", *Roopa-Lekha* 38(1-2), 1969 : 23-28.

A biographical sketch with some rare photographs.

22 LAL SINGH. *Kala, chitarkari te lok sahitya di trimurti. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 115-116.

In Punjabi. Dr. Randhawa as the patron-saint of art, painting and culture of the people.

23 M. S. Randhawa, Vice-President, Indian Council of Agricultural Research. New Delhi, IARI, 1955. 5p.

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Biographical data and information about his publications.

24 MATHUR, B. P. "Chandigarh and town planning in Punjab", *Roopa-Lekha* 38(1-2), 1969 : 267-274.

Dr. Randhawa's contribution to the development of Chandigarh, and his role in town and country planning in Punjab.

25 "A mild man who knows so much to such good purpose", *Times of India*, April 23, 1968 : 5.

A review of the many-sided activities of Dr. Randhawa, in the "Portrait of the week" column.

26 MISHA, S. S. *Jeewan te shaksiat*. *In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 18-23.

In Punjabi. The life and personality of Dr. Randhawa, including his mastery over so many diverse subjects.

27 NANAK SINGH. *Punjabi da bahupaukhi kalakar*. *In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 111-114.

In Punjabi. Many-faceted activities of Dr. Randhawa.

28 PAL, B. P. "Association of Dr. M. S. Randhawa with the All India Fine Arts and Crafts Society", *Roopa-Lekha* 38(1-2), 1969 : 10-13.

His contribution in building up the Society ever since he became associated with it since 1946, and his help to individual artists.

29 PATWANT SINGH. "An experience of immeasurable worth", *Roopa-Lekha* 38(1-2), 1969 : 29.

A day in the life of the Chief Commissioner of Chandigarh, who still could find time to work on his "*Evolution of life*".

30 PODUVAL, R. VASUDEVA. "The versatile aesthetic civilian of India", *Roopa-Lekha* 38(1-2), 1969 : 18-19.

A biographical sketch of Dr. Randhawa—"the last and noblest relic" of the Indian Civil Service. His contribution to the field of science and art.

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31 ROERICH, SVETOSLAV. "A tribute from an artist", *Roopa-Lekha* 38(1-2), 1969 : 14-17.

The contribution of Dr. Randhawa to the knowledge of Kangra paintings and to such diverse subjects as botany, agriculture, planning and social work.

32 ROOPA-LEKHA. V. 38(1-2), 1969. New Delhi, All India Fine Arts and Crafts Society, 1969.

Randhawa festschrift on his 60th birthday. Tributes by celebrated artists and critics on his life and work.

33 RUP SINGH (Our Vice-Chancellor, Dr. M. S. Randhawa). *United Voice* 1(9), Aug. 15, 1969 : 1.

Eulogises Dr. Randhawa's contribution to the development of the Punjab Agricultural University and makes an appeal to him for constructing more houses for university employees.

34 *Sahityakar Dr. Mohinder Singh Randhawa nu sanman.* Chandigarh, Bhasha Vibhag, Punjab, 1969 : 10p.

In Punjabi. Citation on the occasion of the award recognizing his services to Punjabi literature and culture at the Central Library, Patiala, on March 31, 1969.

35 SANDHU, GULZAR SINGH. *Ek bahumukhi pratibha. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 49-54.

In Punjabi. The many-sided genius of Dr. Randhawa.

36 Sanman patar. *In* Sahitakar Dr. Mohinder Singh Randhawa nu sanman. Chandigarh, Bhasha Vibhag, Punjab, 1969 : 7-8.

In Punjabi. An address presented on the occasion of the award recognizing his services to Punjabi literature and culture, at the Central Library, Patiala, on March 31.

37 SARKAR, SUSHIL. Biographical data and bibliography of publications of Dr. M. S. Randhawa. Chandigarh, Government Press, 1968. 22p.

A listing of the published works of Dr. Randhawa, along with his bio-data compiled by the keeper of the Chandigarh Museum.

38 SATYARTHI, DEVINDER. *Shahiryar. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 127-130.

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In Punjabi. Dr. Randhawa's personal library, and Dr. Randhawa as a friend, mentor and guide.

39 SITAL, JEET SINGH. *Trimurti Lane which ek lauda vela. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 105-108.

In Punjabi. A visit to Dr. Randhawa's residence in Delhi.

40 SHIV KUMAR. *Ek chehra. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 17.

In Punjabi. A pen-portrait of Dr. Randhawa in verse.

41 SOBHA SINGH. *Aundian naslan da parerna sarot. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 13-16.

In Punjabi. Tribute by the well-known artist, now settled at Anderetta, Kangra (Himachal Pradesh), including Dr. Randhawa's work for the peasants.

42 SURAJ BHAN. *M. S. Randhawa abhinandan granth.* Delhi, Navyug, 1969. 172p.

In Punjabi. Festschrift, including contributions by many persons, presented on his 60th birthday by a number of well-known organizations representig art, music, science, and agriculture.

43 TEER, GURNAM SINGH. *Harman piara yugpurush. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 93-96.

In Punjabi. Dr. Randhawa as a universally loved man because of his many virtues.

44 TIWARI, VISHWA NATH. *Nikha nikha rah. In* M. S. Randhawa abhinandan granth. New Delhi, Navyug, 1969 : 63-66.

In Punjabi. How Dr. Randhawa selects the right persons during the interviews.

45 TULSI, INDERJIT SINGH. *Ranga da badshah geetan da safeer. In* M. S. Randhawa abhinandan granth. Delhi, Navyug, 1969 : 38-48.

In Punjabi. A poetic tribute to Dr. Randhawa who is described as the 'king of the colours' and 'master of lyrics'.

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46 Varahmihira, *psued.* Dr. M. S. Randhawa *Hindustan Times*, July 2, 1969 : 7.

A biographical sketch and review of his book '*Indian painting*' in the column 'Jantar Mantar' on his 60th birthday.

47 VIRK, KULWANT SINGH. *Navia jamina nava ghar. In* M. S. Randhawa abhinanan granth. Delhi, Navyug, 1969 : 97-104.

In Punjabi. Dr. Randhawa's role in rehabilitation work and planning new colonies in Punjab.

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APPENDIX II

SUPPLEMENTARY ENTRIES

By Dr. M. S. Randhawa

1 "Farm taxes will retard Green Revolution" *Punjab Mail* March 30, 1969 : 8.

Warning against the proposed taxes on agricultural income, and how this will adversely effect the food production.

2 "Forest culture of the aryans", *Tribune magazine* October 19, 1969 : 5.

The love of ancient aryans for trees and nature, as evidenced from the early potsherds, the work of Max Muller on Rig Veda, and the Ramayana and the Mahabharata.

3 "Higher fetilizer output can wipe out food deficit", *Hindustan Times* May 17, 1965 : 8.

Address at a press conference at Gauhati (Assam) on May 15, on intensive agricultural scheme and its introduction in Assam. Dependence on food import can be wiped off if the demand for more fertilizers could be met by the Government.

4 "Puran Singh : poet of the Punjab", *Illustrated weekly of India* 90(41), October 12, 1969 : 59.

His life and struggle, based on the reminiscences of his widow. How Dr. Randhawa persuaded the Sahitya Akademi to publish his works, including translation of his three Punjabi poems.

On Dr. M. S. Randhawa

Tributes to Dr. M. S. Randhawa on his 60th Birthday (Feb. 2, 1969) Chandigarh, 1969. 11 leaves.

Mimeographed copies of tributes paid at a special function held at Chandigarh to honour Dr. Randhawa on his 60th birthday. Tributes from Damodar Das, Chief Commissioner, Dr. Bal of Panjab University, Sneh Pandit, M. N. Sharma, architect and Phycological Society on his life, work and service to science and art; as also messages from W. G. Archer, Keeper of the Indian Section, Victoria and Albert Museum, London, Dr. D. N. Wadia and others.

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APPENDIX III

BIOGRAPHICAL DATA

Name	..	RANDHAWA, Mohinder Singh
Nationality	..	Indian
Date of birth	..	2nd February, 1909
Place of birth	..	Zira, district Ferozepur (Punjab), India
Home	..	Village Bodal, tehsil Dasuya, district Hoshiarpur (Punjab)
Father	..	Sardar Sahib S. Sher Singh Randhawa (Died 1925)
Mother	..	Shrimati Bachint Kaur, village Takharan, tehsil Samrala, district Ludhiana (Died 1917)
Wife	..	Shrimati Iqbal Kaur, daughter of Sardar Bahadur Dr. Harbhajan Singh, Civil Surgeon, Hoshiarpur.
Address	..	Garden House, Garden Colony, P.O. Kharar, near Chandigarh
Mother-tongue and other languages known	..	Punjabi, Hindi, Urdu, English.
Academic career	..	Matriculation—First Division, Khalsa High School, Muktsar, 1924.
		F.Sc. (Medical)—First Class. Forman Christian College, Lahore, 1926.
		B.Sc. (Hons.) in Botany—First Class. Government College, Lahore, 1929.
		M.Sc. (Hons.)—First Class (Punjab University) Government College, Lahore, 1930.
		D.Sc. (Punjab University) 1955.
Profession	..	Indian Civil Service. Joined the service on the 23rd September, 1934.
Postings	..	1934-1936 Assistant Magistrate, Saharanpur, Uttar Pradesh.

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Postings ..

1936-1938 Joint Magistrate, Faizabad, Uttar Pradesh.

1938-1939 Joint Magistrate, Almora, Uttar Pradesh.

1939-1940 Additional District Magistrate and Collector, Allahabad, Uttar Pradesh.

1940-1941 District Magistrate and Collector, Agra, Uttar Pradesh.

1942-1945 Deputy Commissioner, Rae Bareli, Uttar Pradesh.

1945-1946 Secretary, Indian Council of Agricultural Research, New Delhi.

1946-1948 Deputy Commissioner, Delhi.

1948-1949 Deputy Commissioner, Ambala (Punjab).

1949-1951 Additional Director-General, Rehabilitation and subsequently Director-General Rehabilitation, Punjab, with headquarters at Jullundur.

1951-1953 Commissioner, Ambala Division, Punjab.

1953-1955 Development Commissioner and Commissioner, Rehabilitation and Custodian, Evacuee Property, Punjab.

1955-1960 Vice-President, Indian Council of Agricultural Research and Additional Secretary to the Government of India, Ministry of Food & Agriculture, New Delhi.

1961-1964 Adviser, Natural Resources, Planning Commission.

1964-1966 Special Secretary, Ministry of Food & Agriculture, Government of India.

July 1966-October 1966 Financial Commissioner, Capital Project, Punjab.

November, 1966-1968 Chief Commissioner, Chandigarh Union Territory, Chandigarh.

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November, 1968. Vice-Chancellor, Punjab Agricultural University, Ludhiana.

Particulars of Travel .. (i) INDIA :

Travelled in Kashmir Valley, Amarnath Cave, Kolahoi glacier. Collected algae from the lakes and fresh-water streams.

Explored Pindari Glacier in Kumaun Himalayas and collected a number of new algae.

Travelled from Simla to Narkanda, Kulu and Rohtang Pass.

Travelled in Lahaul Valley up to Keylong.

Explored the Simla Hills and wrote a travel account.

Travelled to Kota, Bundi, Gwalior and saw the collection of paintings.

Travelled in Rajasthan. Visited Jaipur, Kishangarh, Ajmer, Chittor, Udaipur and Jodhpur and examined collection of paintings.

Travelled in Kangra Valley.

(ii) TRAVELS ABROAD AND ASSOCIATION WITH INTERNATIONAL ORGANIZATION :

Secretary, Indian Delegation to F.A.O.

Conference, Quebec (Canada), 1945.

Leader of the Indian delegation to F.A.O. Regional Conference, Bandung, Indonesia, 1957.

Member of the Indian delegation to F.A.O. Conference, Rome, 1958.

Leader of the Indian delegation to the Commonwealth Agricultural Bureaux Conference, London, 1960.

Member, Indian delegation to the United Nations conference on science and technology for underdeveloped countries, Geneva, 1963.

Leader of the Indian delegation to 7th F.A.O.

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Regional Conference, Manila, The Philippines, November, 1964.

Leader of the delegation of vice-chancellors of agricultural universities of India, New York, Washington, Columbus, Los Angeles, November 1968.

Leader of the Indian delegation to the conference at Durhum University, U.S.A., August, 1969.

(i) *Scientific Organizations* .. Association with scientific, art and literary organizations :

President, National Academy of Sciences.

President, Northern India Science Association.

Vice-President, Indian Society of Agricultural Statistics.

Chairman, Agriculture and Food Products Division, I.S.I.

Member, Executive Council of the National Institute of Science.

Member, Board and Governing Body of the Council of Scientific and Industrial Research.

Member, Executive Council of Birbal Sahni Institute of Palaeobotany, Lucknow.

First Indian member of the international jury for Kalinga Prize for popularization of Science.

President, Phycological Society (India).

Fellow, National Institute of Sciences (India), Delhi.

(ii) *Horticulture, Landscaping, and Town Planning Organizations* .. Chairman, Chandigarh Landscape Committee.

President, Horticultural Society of India.

Member, Delhi Landscape Committee.

Chairman, Chandigarh Capital Project Control Board (1966-1969).

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(iii) *Art Organizations*	..	President, All-India Fine Arts and Crafts Society, New Delhi.
		President, Indian Academy of Photography.
		President, Camera Society of India.
		Chairman, Chandigarh Museum Advisory Committee.
		Chairman, Art Purchase Committee of Chandigarh Museum Art Gallery.
		President, Punjab Lalit Kala Akademi.
		Chairman, Lalit Kala Akademi, Chandigarh.
(iv) *Literary Organizations and Universities*	..	Member, Advisory Board for Punjabi of Sahitya Akademi, New Delhi.
		Member, Standing Committee for Punjabi of State Advisory Board for the Department of Languages, Punjab Government.
		Fellow of the Senate of the Punjabi University, Patiala.
		Fellow of the Senate of Punjab University, Chandigarh.
		President, Association of Vice-Chancellors, Agricultural Universities, India.
(v) *Editorial*	..	Chief Editor, Monographs on algae series, Indian Council of Agricultural Research, New Delhi.
		Chief Editor, Monographs on botany series, Council of Scientific and Industrial Research, New Delhi.
		Chief Editor, Roopa-Lekha, the Journal of the All-India Fine Arts and Crafts Society, New Delhi.
		Chief Editor, Everyday Science, the journal of Northern India Science Association, Chandigarh.

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